



## Maintenance Information Manual

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**5211**

## Printer Theory - Maintenance Volume 2

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SECTION 15: THEORY OF OPERATION

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INTRODUCTION

The IBM 5211 Printer is a line printer using belt technology. The print belt, a 1219 mm (48 in.) steel belt, has 192 characters at the top of the belt and timing marks at the bottom. Printing is done by driving the hammers against the back of the paper and ribbon and against the moving print belt. See A. The print line has 132 print positions that are spaced 10 characters per inch.

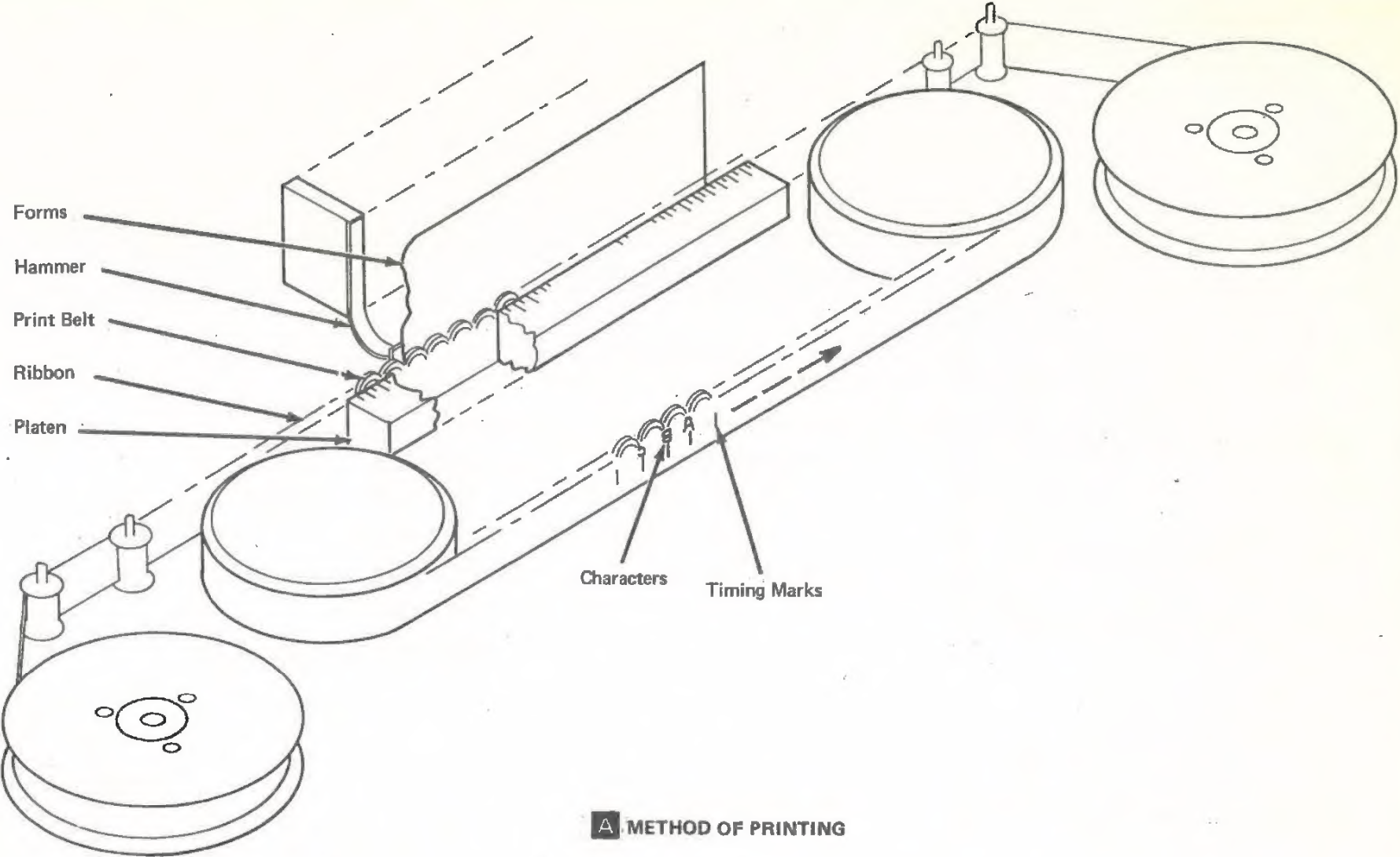
There are two Models of the IBA! 5211 Printer:

- Model-1 has 66 hammers, one for two print positions. Each hammer is optioned twice for each print position.
- Model-2 has 132 hammers, one for each print position. Each hammer is optioned once for each print position.

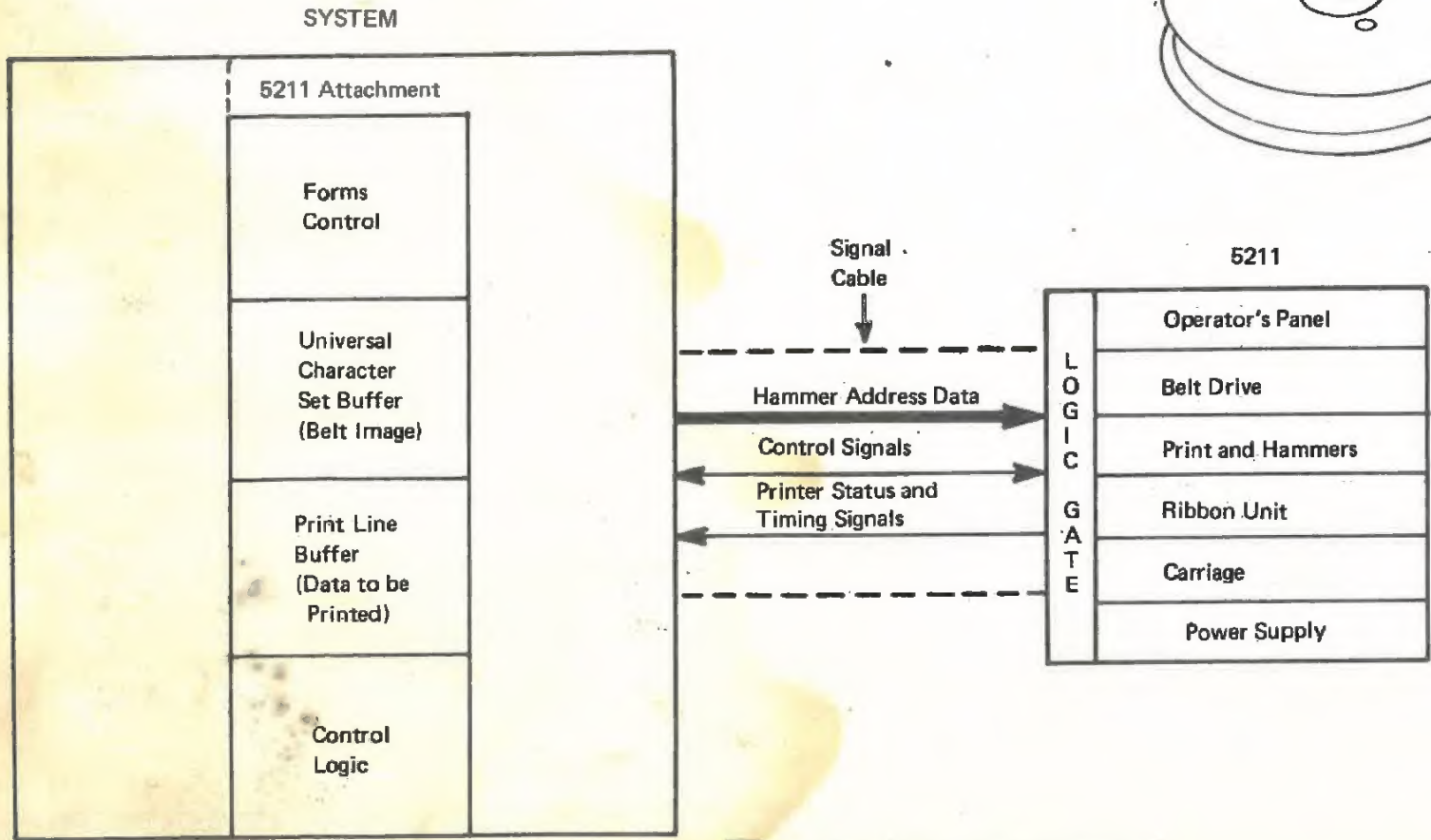
| Characters per character set | Character sets on each belt | Print Speed (lines per minute) |         |
|------------------------------|-----------------------------|--------------------------------|---------|
|                              |                             | Model-1                        | Model-2 |
| 48                           | 4                           | 160                            | 300     |
| 64                           | 3                           | 120                            | 235     |
| 96                           | 2                           | 84                             | 164     |

Carriage spacing and skipping is controlled by the system at either 6 lines-per-inch or 8 lines-per-inch (6LPI/8LPI).

The printer attaches to the system through the signal cable and the 5211 attachment. See B. For detailed information, see "Attachment to System", 15-020.



A METHOD OF PRINTING



B ATTACHMENT TO THE SYSTEM



ATTACHMENT TO SYSTEM

DESCRIPTION

The IBM 5211 Printer attaches to the using system via a signal cable connected to the system's 5211 Printer Attachment. The printer attachment logic is located in the system. The printer logic and driver circuits are located on the printer logic gate in the printer.

The attachment contains 3 functional units that are needed to control the operation of the printer.

Forms Control Buffer (FCB) A

The Forms Control Buffer is loaded with the number of lines that are on the forms to be used. The line count is updated as the carriage moves the forms. This takes the place of the carriage tape.

Print Line Buffer (PLB) B

The Print Line Buffer is loaded with the data to be printed.

Universal Character Set Buffer (UCSB-Belt Image) C

The UCSB is loaded with the 192 characters that are on the print belt. The data to be printed is compared with the belt image characters in the UCSB for hammer addressing.

System D

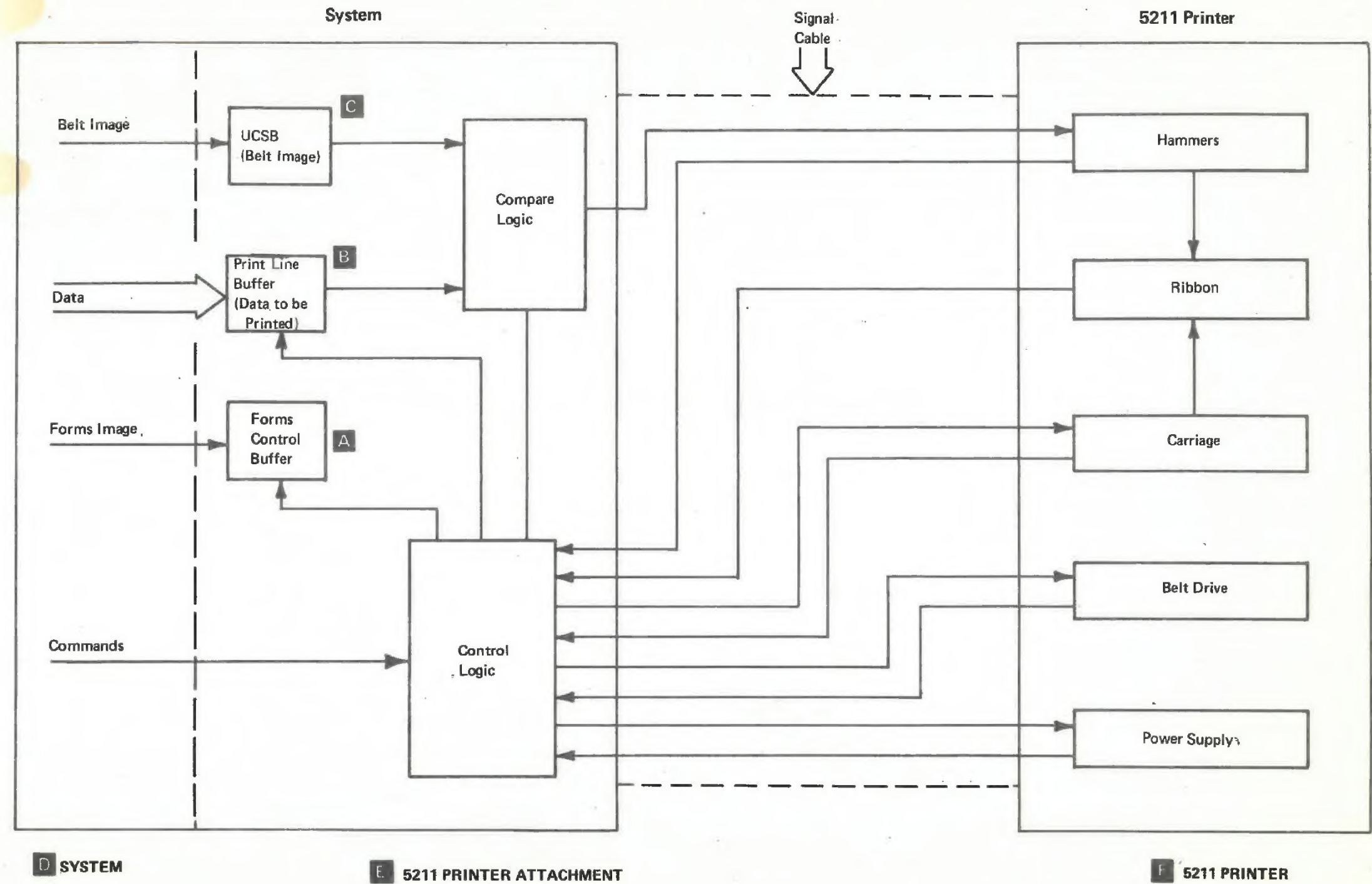
The System contains the control program and the attachment controller. The System sends printer commands and data to the printer attachment.

5211 Printer Attachment E

The Printer Attachment contains control and checking logic for itself and the printer. It generates signals to run the belt and carriage motors, address and fire the hammers, and activate the lights on the operator's panel.

5211 Printer F

The Printer contains functional units consisting of the print belt, ribbon, hammers, carriage, and power supply, in addition to the logic and driving circuits to operate these units. It also contains circuits for feedback to the attachment, error checking, and other special printer circuits, such as the CE Switches.





FUNCTIONAL UNITS AND DATA FLOW

Belt Motor and Drive A

The belt drive includes the belt motor, belt feedback, belt, belt pulleys, Print Subscan (PSS) emitter, and control logic. Its function is to move the belt in front of the hammers at a near-constant speed. The 'Belt Go' signal from the system generates the first motor advance pulse to start the belt motor. The motor is first detented, then it starts turning. After the motor starts turning, feedback pulses from the belt motor feedback circuit are used to generate additional motor advance pulses to keep the motor turning and accelerating. When the motor reaches a certain speed, as measured by the frequency of the feedback pulses, the motor advance control switches to the 4 MHz oscillator. When the belt is up to speed, (home and PSS pulses generated from the belt timing marks), the signal 'Belt Up to Speed' is sent to the system.

See "Print Belt and Drive", 15-070.

Print Subscan (PSS) Pulses and Home Pulses B

These pulses are generated from the timing marks on the print belt as it moves past the PSS emitter. Two PSS pulses are generated from each timing mark on the belt. One home pulse is generated for each home position (missing timing mark) on the belt. There is one home position for each character set on the belt.

After the signal 'Belt Up To Speed' is active, the PSS and home pulses are sent to the system. The system synchronizes itself to the printer with the home pulses. The system uses the PSS pulses to synchronize the characters on the belt to the correct hammers for printing. See "Print Subscans and Home Pulses", 15-140.

Print Unit and Hammers C

The print unit includes the print belt drive, platen, ribbon, and forms thickness control. The hammer unit includes all the hammers and hammer coils. The print unit positions the platen, the print belt, and the ribbon in front of the hammers. The forms thickness control adjusts the printer to print on different forms thicknesses by:

- 1. Changing the gap between the platen and the hammers.
  - 2. Changing the duration of the hammer drive pulses.
- See "Print Unit and Hammers," 15-150.

Ribbon Drive D

The ribbon drive includes the ribbon motors, reels, ribbon reversing switches, and control logic. The ribbon drive moves the ribbon horizontally across the print line. The ribbon moves during both printing and carriage operations. The ribbon is driven by either the right or the left drive motor under control of the ribbon reverse switches. A small current, called the ribbon-drag current, is applied to the non-driving motor to hold tension on the ribbon.

See "Ribbon", 15-220.

Paper Clamp E

The paper clamp, located under the print unit, has a magnet that operates a clamp bar. The clamp, when activated, holds the forms tightly against a guide under the hammers to prevent horizontal movement of the forms while printing. The system activates the paper clamp before and during printing, then deactivates it before the carriage moves the forms.

See "Forms Path", 15-250.

Carriage F

The carriage includes the carriage motor, tractors and control logic. The carriage moves the forms through the printer under system control. After the paper clamp releases the forms, the system activates the 'Carriage Go' Signal. The printer logic then generates the first carriage advance pulse to start moving the carriage motor. After the motor starts turning, feedback pulses from the carriage motor feedback generate additional carriage advance pulses that advance the motor and also signal the system that the carriage moved. The system counts the advance pulses to determine how far the carriage has moved. When the carriage has moved the distance specified in the forms command, the system deactivates 'Carriage Go'. The 5211 then generates three stop pulses to slow the carriage motor down before stopping it. A small detent current holds the carriage motor in the stopped position.

See "Carriage", 15-270.

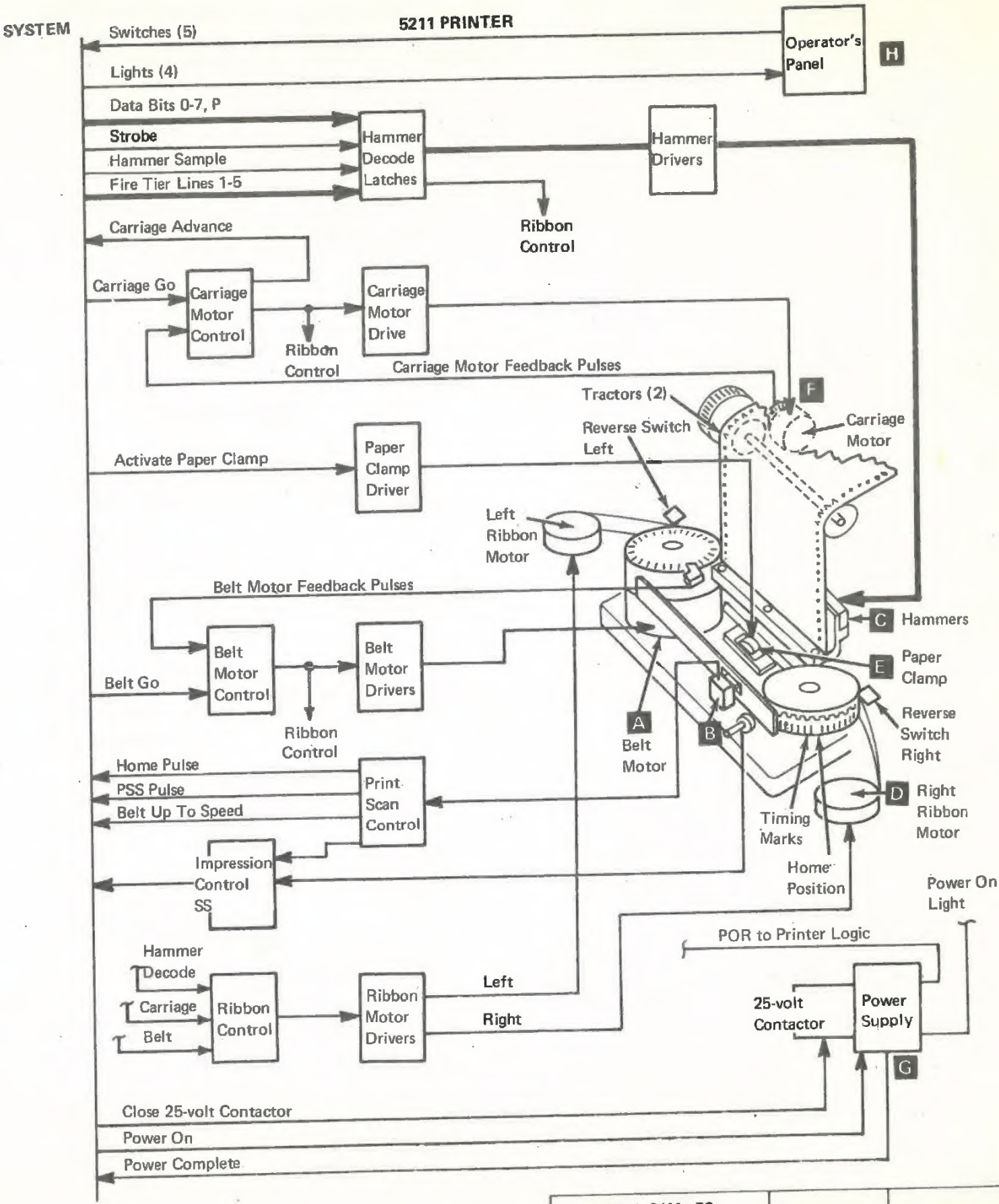
Power Supply G

The power includes the primary section, the secondary section, and the distribution. The power supply converts the ac line voltage to dc voltages to operate the printer. The system normally controls the power supply in the 5211. The system activates the 'Power On' signal to turn on the printer power. When the power supply determines that the dc voltages are correct, it sends a 'Power Complete' signal to the system. The system then sends the 'Power On Reset' signal to the printer logic, followed by the 'Close 25-volt Contactor' signal.

See "Power Supply", 15-340.

Operator's Panel H

The operator's panel enables communication with the system. The signals from the four keys and the 6LPI/BLPI switch go to the 5211 logic then to the system. The Power light is turned on by the printer power supply. The Ready light is turned on by the system. The Check, Interlock, and Forms lights flash on and off continuously when activated by the system.





5211 PRINTER/SYSTEM SIGNALS

- The signals between the 5211 Printer and the System's Printer Attachment are described on this page.

Power A

Power On

This signal from the host system, turns on the 5211 power supply. When deactivated, it turns off the 5211 power supply.

Power Complete

The printer sends this signal to the system when all the voltages in the printer are correct.

Power On Reset (POR)

The system activates this signal to reset the printer logic circuits when turning power on, turning power off, and when certain errors occur.

Close 25-volt Contactor

The system activates the 25-volt contactor in the printer to distribute 25-volt power to the printer motors, hammer coils, and paper clamp magnet circuits.

Power Check

The power supply in the printer sends this signal to the host system when any failure occurs in the power supply.

For additional information, see "Power Supply", 15-340.

Interlocks B

Cable Interlock

The signal starts in the system, then goes through six signal cable connectors; (3 at the system, and 3 at the printer) and 1 at the Printer Operator's Panel. If the circuit cannot be completed, the system activates the signal. The signal, when active, indicates that a cable connector is not seated correctly or is in the wrong position.

For additional information, see "Operator's Panel," Section 3, 3-000.

Print Unit (Throat) Closed

This signal from the printer indicates that the print unit casting is closed and that the print belt cover is installed.

Belt Drive and Subscan Control C

Belt Go

This signal, from the system, activates the belt motor control circuits to run the belt motor. When deactivated, the belt motor stops.

Belt Up To Speed (BUTS)

This signal, when activated by the printer, indicates that the belt has reached operating speed. The system must receive this signal within 1.4 seconds after 'Belt Go' is active.

Print Subscans (PSS)

These signals from the printer are generated from the belt timing mark. The system uses these pulses to synchronize the characters on the belt to the correct hammer for printing.

Home

This signal from the printer is generated when a home position is sensed from the belt (one of the missing timing marks). The system uses the home pulse to synchronize itself to the printer.

For additional information, see "Print Belt and Drive," 15-070 and "Print Subscans and Home Pulses," 15-140.

Hammer Addressing and Firing D

Impression Control Single Shot

This signal from the printer has different time periods depending on the position of the forms thickness control. The system uses the pulses to change the length of the fire tier (hammer fire) pulses.

Data Bits 0-7, P

These signals from the system go to the hammer address decode circuits to turn on the correct hammer latch when 'Strobe' is active.

Strobe

This signal from the system gates the hammer address through the decoder to turn on the hammer latch in the printer.

Data Parity Check

This signal indicates to the system that the printer has sensed even parity from the data bits.

Fire Tiers 1-5

These 5 hammer-fire pulses from the system activate the hammer driver to fire the hammer if its corresponding latch is turned on. The pulses follow in sequence, Fire Tier 1, Fire Tier 2, and so on. The time duration of the pulse is changed by the impression control single shot.

Hammer Sample

The system sends 133 pulses (1 sync, followed by 132 sample) to the printer to sense which hammers are on.

Hammer Echo Return

These signals from the printer are returned to the system for each hammer sensed on by the hammer sample pulses.

Not Print Time

The printer signals the system that no data is being transmitted following printing to run the ribbon and to verify for an "Any Hammer On" condition.

For additional information, see "Print Unit and Hammers," 15-150.

Ribbon E

Printer Busy

The printer signals the system when the printer senses a ribbon reverse or too much belt speed variation. The system stops sending 'Data Bits' and 'Strobe' when 'Printer Busy' is active.

Ribbon Check

The printer signals the system that a ribbon motion or ribbon reverse failure was sensed by the printer.

For additional information, see "Ribbon", 15-220.

Forms Path and Carriage F

Activate Paper Clamp

The system activates the paper clamp to hold the forms when printing.

Carriage Go

The system activates the carriage motor control circuits to run the carriage motor.

Carriage Advance

The printer sends a carriage advance pulse to the system each time the carriage motor is advanced. The system counts the pulses to determine how far the carriage has moved.

Forms Pulse

The printer sends this pulse to the system each time a feed hole is sensed at the left tractor. The system uses the pulses to determine if forms movement is correct.

End-of-Forms

The printer signals the system that the end-of-forms switch has sensed the end of the last form in the printer.

For additional information, see "Carriage", 15-270.

Lights, Keys, and Switches G

Operator Panel Lights

The system turns on the respective light on the Printer Operator's Panel. (Check, Interlock, Forms, or Ready).

For additional information, see "Operator's Panel," 15-050.

Operator Panel Keys

Each signal from the printer stays active as long as the respective key is pressed. (Carriage Restore, Carriage Space, Ready, or Stop/Reset).

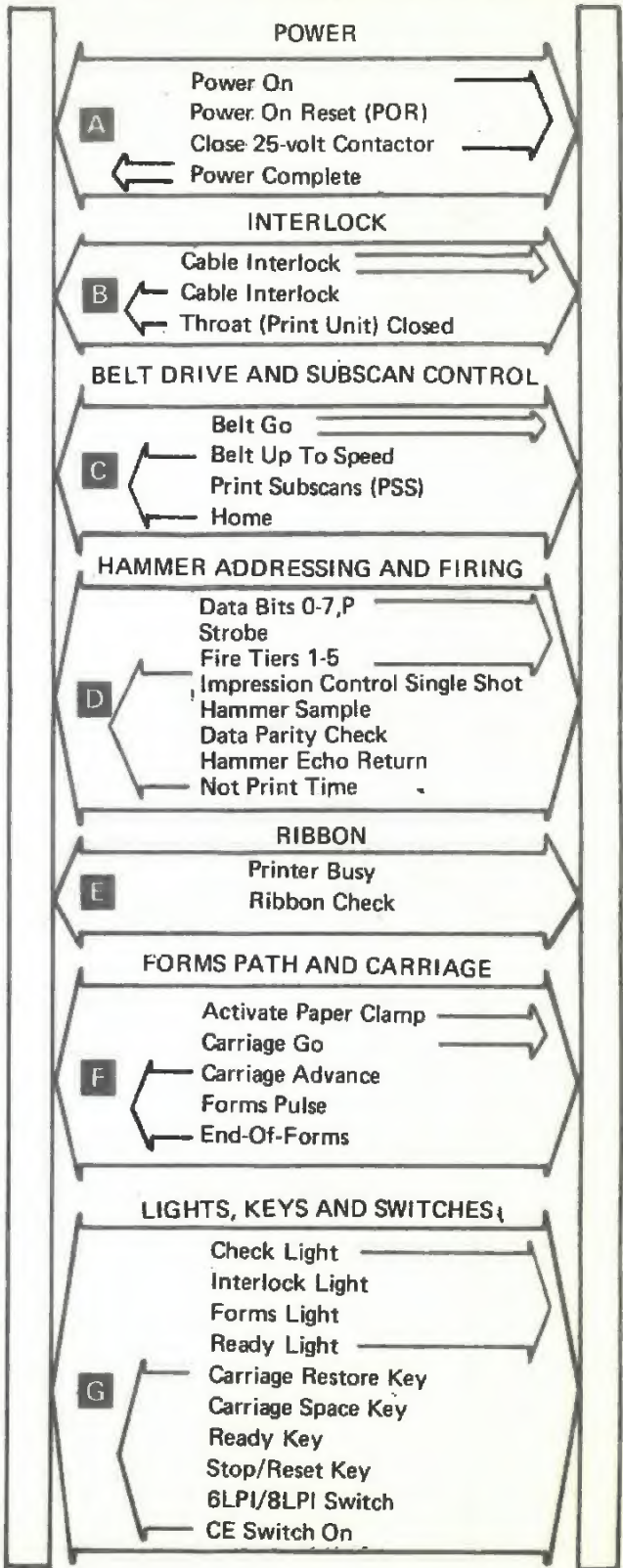
6LPI/8LPI Switch

The printer signals the system that the operator wants forms spacing at either 6 or 8 lines per inch.

CE Switch On

The printer signals the system whenever any of the 4 CE switches are turned on. (BELT GO, CARR, RIBBON, or PAPER CLAMP).

For additional information, see "CE Switch Panel", Section 2, 2-000.





OPERATOR'S PANEL

GENERAL DESCRIPTION

The 5211 Operator's Panel enables communication with the system. The signals from the four keys and the 6LPI/8LPI switch go to the 5211 logic then to the system. The Power light is turned on by the printer power supply. The Ready light is turned on by the system. The Check, Interlock, and Forms lights flash on and off continuously when activated by the system.

The Operator's Panel has a light panel assembly and a key panel assembly located under the cover. The 6LPI/8LPI switch is in the base of the Operator's Panel. The light panel circuit board has five light-emitting diodes (LED's) and their drivers. The key panel circuit board has 4 elastic-diaphragm switches (EDS) that are closed by pressing their respective key.

For removal and installation, see "Operator's Panel," Section 3, 3-000.

Interlock Light (Yellow)

The Interlock light indicates any of the following conditions:

- Print unit open
- Print belt cover not installed

The light is turned off by closing the print unit and/or installing the print belt cover.

Check Light (Yellow)

The Check Light indicates the system has detected any of the following printer error conditions:

|                          |                                |
|--------------------------|--------------------------------|
| • Belt up to speed check | • Printer busy too long check  |
| • Belt sync check        | • Printer busy too often check |
| • Belt speed check       | • Ribbon check                 |
| • Data parity check      | • Forms jam check              |
| • Hammer echo check      | • Carriage check 1             |
| • Any hammer on check    | • Carriage check 2             |

The Check light is turned off by pressing the Stop/Reset Key on the printer.

Forms Light (Yellow)

The Forms light indicates the system has detected one of the following forms conditions:

- End-of-forms
- Carriage check 1
- Carriage check 2
- Forms jam

The Forms light is turned off by pressing the Stop/Reset Key on the printer.

Ready Light (Green)

The Ready light indicates that the printer is ready. It is turned on by the system when the Ready key is pressed and neither the Check, Interlock, nor Forms light are on. It is turned off by pressing the Stop/Reset Key, or by any condition that turns on the Check, Interlock, or Forms lights.

Power On Light (Red)

The Power On light indicates that the printer power supply is active. It is turned on by the 5211 Power Supply. It is turned off when the +5-volts is not active in the 5211 Power Supply.

Stop/Reset Key

This key has two functions:

1. Stop. When the printer is ready, pressing this key sends a signal to the system that the operator wants to stop the printer. The system stops the printer after the program operation is completed. The ready light is turned off and the printer is made not ready.
2. Reset. When the Check or Forms light(s) is on, pressing this key sends a signal to the system to reset the light(s). The system then turns off the Check and/or the Forms light(s).

6LPI/8LPI Switch

This switch sets forms spacing to either 6 lines-per-inch or 8 lines-per-inch.

Carriage Restore Key

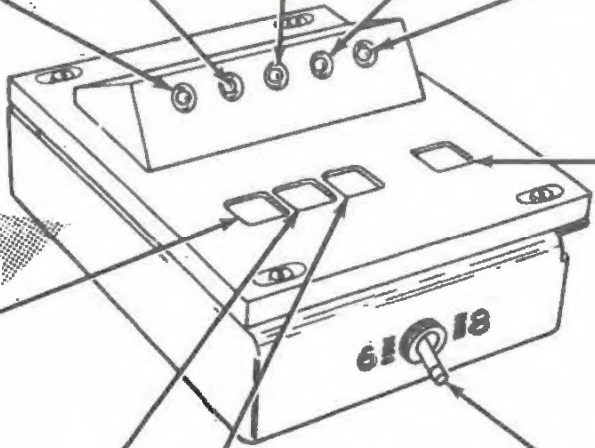
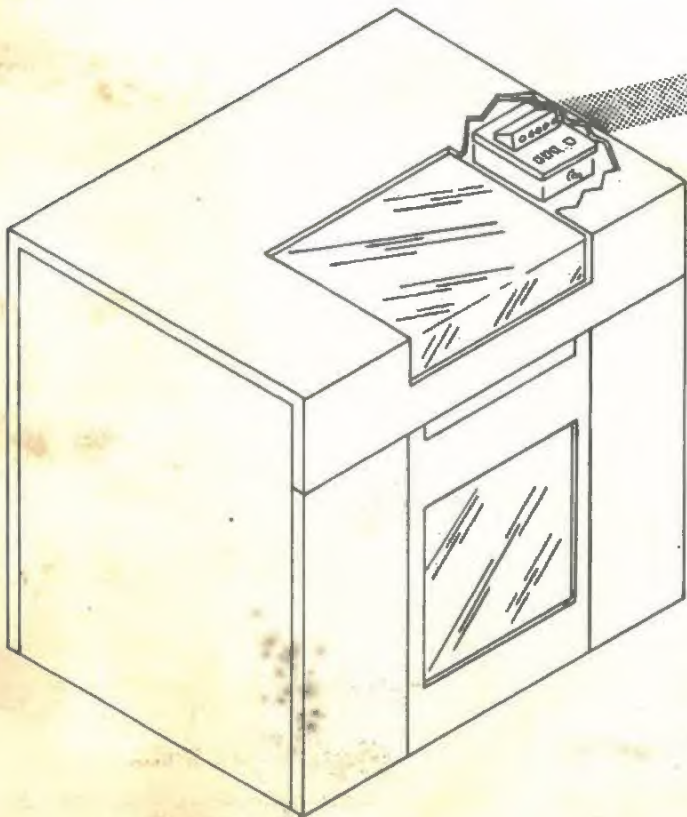
Pressing this key advances the forms to the first line to be printed. The key is active only when the printer is not ready.

Carriage Space Key

Pressing this key advances the forms one line space, 1/6 or 1/8 inch, depending on the position of the 6LPI/8LPI switch. The key is active only when the printer is not ready.

Ready Key

Pressing this key signals the system that the printer is ready for operation. The system then turns on the Ready Light, and starts the belt motor. The key is not active if either 'Interlock' or 'Printer Busy' is active.





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# PRINT BELT AND DRIVE

**NOTE:** For all removals, installations and adjustments, see Section 4,4-000.

## PRINT BELT DRIVE

The print belt drive starts the belt moving, accelerates it up to speed, and maintains the belt speed. The theory of how this is done follows.

### Start Print Belt Motor

'Belt Go' from the system causes the print belt motor to detent. At the end of detent time, the motor starts.

### Acceleration and Running Speed

The print belt motor speed continually increases until the motor feedback pulses which have been driving the motor, indicate that the motor is up to speed. Belt control then switches from the feedback pulses to pulses generated by a 4 megahertz oscillator.

### Belt Synchronization With CPU or Host System

'Home Pulses' from the timing marks on the print belt synchronize the characters on the print belt with the print control unit Universal Character Set Buffer. (UCSB) This buffer in the system contains the character image of the print belt.

### Error Checking

Print belt alignment, speed, breakage and synchronization with the system are monitored by the use of the Home and Print Subscan (PSS) pulses. Failures drop 'Ready' and require operator interruption.

## PRINT BELT DRIVE MECHANISM

The print belt and drive mechanism is designed to move the print belt at an even speed past the print line. The mechanism also allows easy replacement of print belts.

### Motor and Drive Pulley

The print belt drive motor, located on the left end of the print unit, is a vertically mounted stepper motor which turns the drive pulley **A** counterclockwise. The motor is driven in four different stages:

1. Detent
2. Start
3. Accelerate
4. Run

The pulley is free to float vertically on the motor shaft. This allows for the difference in flexibility of the belts. The cover over the drive pulley limits the upward movement. See "Print Belt Drive Motor Control," 15-080, for the three stages of control of the stepper motor.

### Print Belt Positioning Rollers

The two positioning rollers **B** are located below and behind the drive and the idler pulleys.

The purpose is to limit the downward travel of the print belt. Because of the flexible differences between belts, the belt drive and the idler pulleys are free to float vertically on their shafts. See "Belt Positioning Rollers", Section 4-000, for installation.

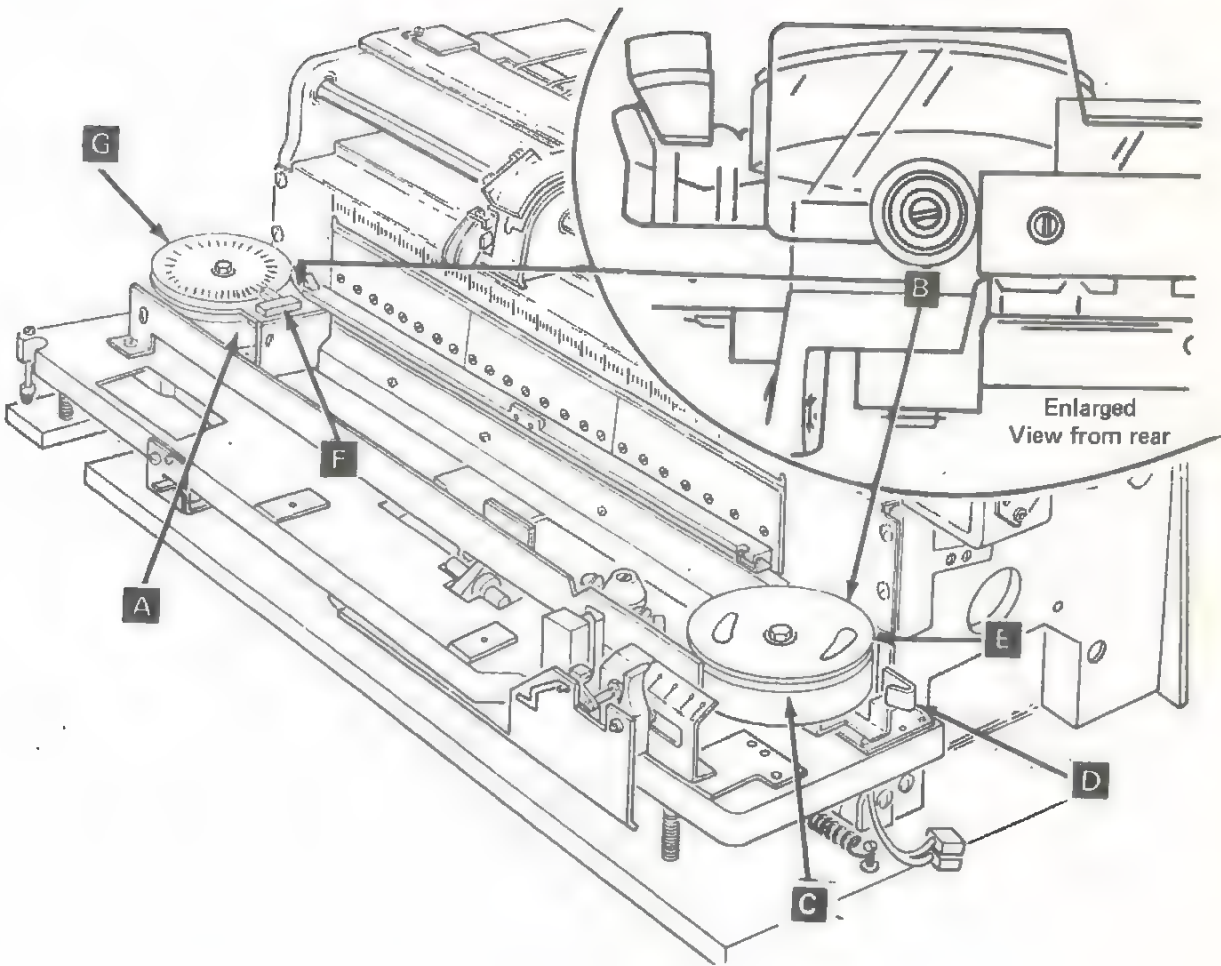
### Idler Pulley and Print Belt Release Mechanism

The idler pulley **C** provides tension to the right end of the print belt. Moving the print belt release lever **D** forward, moves the idler pulley to the left, releasing the belt. For adjustment of the belt idler pulley bracket, see "Belt Idler Pulley Bracket — Adjustment", Section 4, 4-000.

The cover over the idler pulley limits the upward travel of the idler pulley (See "Print Belt Positioning Rollers", 15-070. It also provides finger holes **E** for easier turning of the pulley by hand.

### Print Belt Motor Feedback

The feedback pulses are used to monitor the speed of the belt motor and to provide constantly increasing feedback pulses to drive the motor faster. The feedback LED assembly **F** senses the holes in the feedback timing disk **G**, by shining a light through the holes in the timing disk and sensing the light with a photo transistor circuit, which amplifies the signal. (See Section 18, ZA082.) This feedback pulse is used to accelerate the print belt motor to print speed. (See "Print Belt Drive Motor Control, Section 15-080) The feedback LED block can be adjusted to change the lead time of the pulses, thereby changing the speed of the stepper motor (during acceleration time only). See "Belt Motor Feedback LED-Adjustment", Section 4,4-000.





PRINT BELT DRIVE MOTOR CONTROL

The print belt drive motor and mechanism is used to move the print belt past the front of the hammers at a constant speed, to allow evenly spaced printing. Motor drive during these stages is through printer circuitry which uses a one megahertz pulse and a motor drive pulse to advance a two position ring. The ring produces A, not A, B, and not B pulses which are sent to a motor driver card to drive the print belt drive motor. See "Print Belt Drive Motor Control Logic", 15-130. The four stages of control (See "Motor and Drive Pulley", 15-070) generate 'Motor Drive' A as shown:

|              |   |   |
|--------------|---|---|
| Detent       | 'Belt Go Control' until 'Belt Go Delayed' | J |
| Start        | 'Start Pulse'                             | B |
| Acceleration | 'Feedback'                                | C |
| Run          | 'Gated Open Loop'                         | D |

For timing relationships of the 4 stages, see "Print Belt Motor Control Timing", 15-120.

4 Megahertz Oscillator

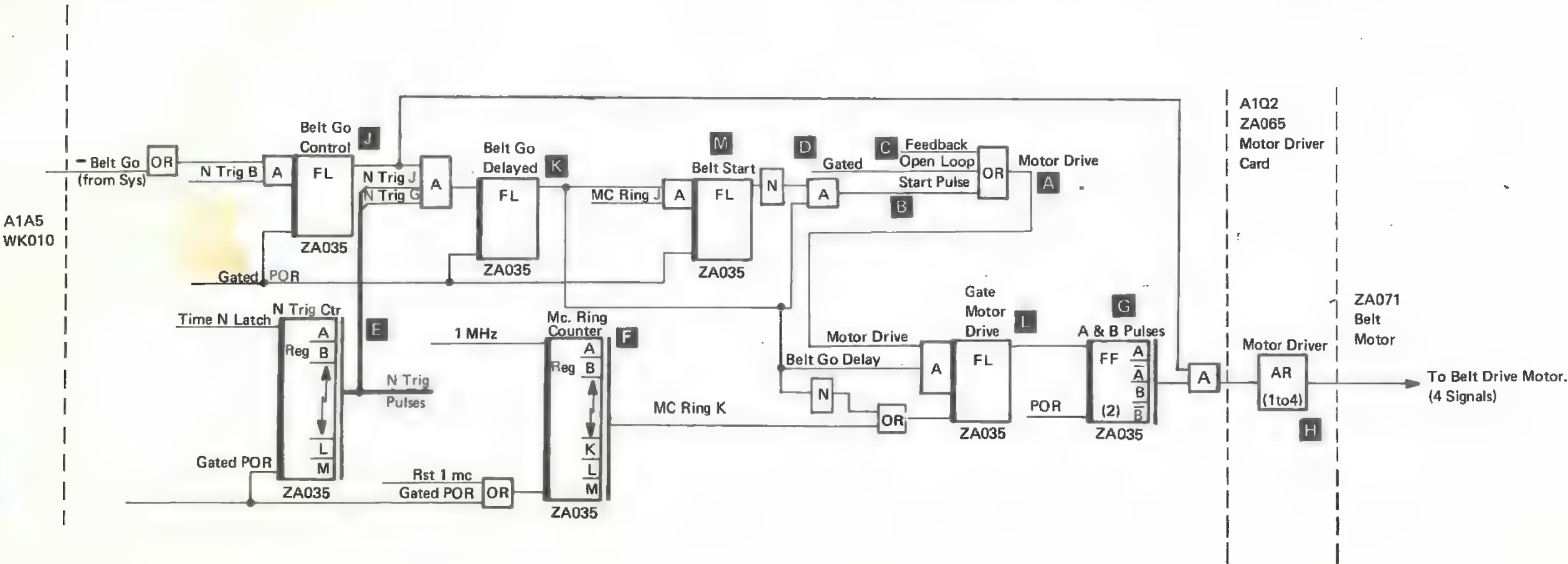
A 4 megahertz (MHz) oscillator, (See "Amplifier Card", Section 18, ZA030) starts when the printer is turned on, and it supplies 4 MHz, 1 MHz and .25 MHz pulses to various logic circuits. The 4 MHz oscillation starts an 'N' ring E that produces pulses approximately every 1.376 ms. These pulses are labeled 'N Trig A' through 'N Trig M'. The 1 MHz pulse starts an 'MC' ring F to produce pulses labeled 'MC Ring A' through 'MC Ring M'. These counters provide timing pulses internally to the belt control card. See "Belt Control", Section 18, ZA035.

Start Print Belt Motor (Start)

Belt Go Control J detents the motor to ensure counter-clockwise rotation with the start pulse and succeeding pulses. See "Print Belt Motor Control Timing", 15-120. Without this electrical detent, the motor might not turn in the correct direction. The motor can now be started from this detent position.

The objective in starting the motor is to activate 'Motor Drive' A to gate the A & B pulse 'FF' latches G, and to send a combination of A and B pulses to the Motor Driver card H to start the motor. See "Belt Motor", Section 18, ZA 071.

'Belt Go' from the system, along with an 'N Trig B' pulse activate the Belt Go Control latch J. 'Belt Go Control' with timing pulses 'N Trig J' and 'N Trig G' turn on the Belt Go Delayed latch K. 'Belt Go Delayed' allows the Gate Motor Drive Latch L to be set by 'Motor Drive', which is activated by 'Start Pulse'. 'Start Pulse' deactivates when the Belt Start latch M turns on at MC Ring J time. The Gate Motor Drive latch resets at MC Ring K time.





### Print Belt Motor Feedback Control (Accelerate)

The print belt drive stepper motor must accelerate to print speed within 1.4 seconds after 'Belt Go'. The belt control circuits monitor the speed during this time by using the belt motor feedback pulses. See "Print Belt Motor Feedback", 15-070. As the motor starts to turn, the feedback LED senses the first hole in the timing disk. This pulse, when amplified, sets the Feedback latch **A** at D3 time **B** (It will reset at the following D2 time.) 'Feedback Latch' and not 'Motor Up to Speed' (MUTS) are ANDed to give 'Feedback' **C**. These 'Feedback' pulses increase in frequency as the speed of the motor increases.

The Slow Latch **D** is turned on every 900  $\mu$ s by the 900 decode **E**. The Slow latch, when on, prevents the MUTS latch **F** from turning on and therefore allows the line 'Feedback' **C**.

However, when the frequency of the feedback pulses from the LED cause the Feedback latch to turn on *before* 900  $\mu$ s, the MUTS latch **F** *will* turn on. The Feedback latch will continue to turn on but its output is now degated by 'MUTS'.

### Gated Open Loop Control (Run)

The output of the Motor Up To Speed latch allows timing pulses from the '919 decode' **G** to set the Open Loop latch **H**. 'Open Loop' with '1Mc' becomes 'Gated Open Loop' which provides 'Motor Drive' and run mode.

### Belt Up To Speed (UTS)

'Belt UTS' to the System **J** indicates that the correct print belt speed has been reached. The 'Belt UTS Gate' had been set after start time and by the timing pulse 'N Trig K' **K**. The 'Belt UTS' latch can be set when these three conditions are active:

1. The PS and Home pulses are inactive **L**
2. The motor is up to speed **M**
3. The belt is in motion, not installed **N**

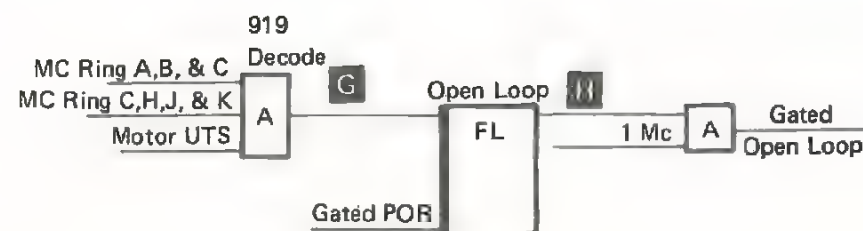
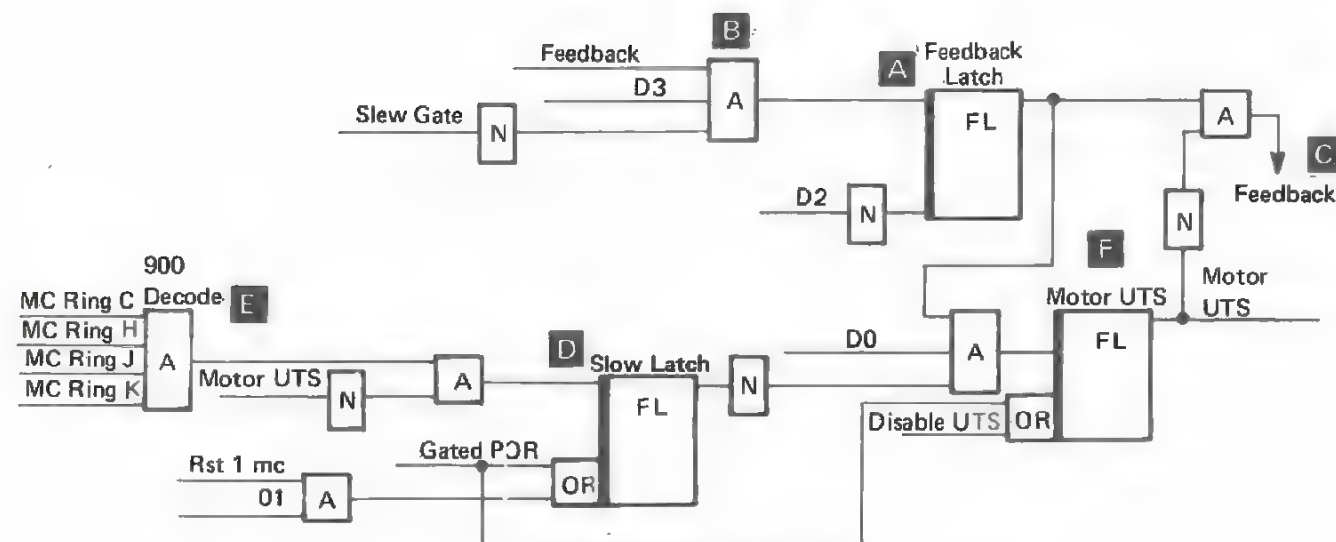
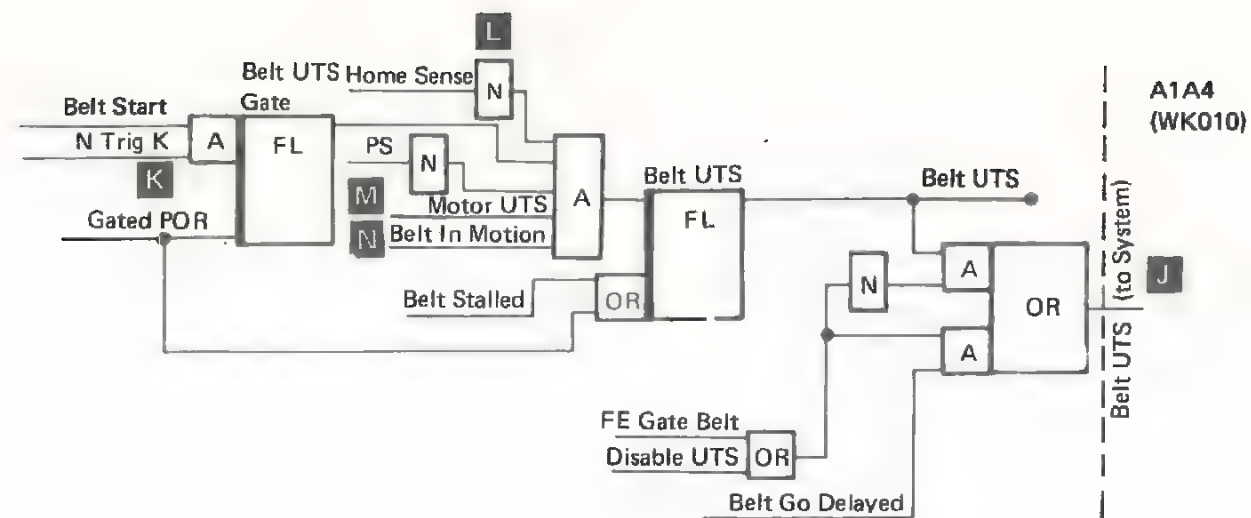
'Belt UTS' must be active within 1.4 seconds after 'Belt Go' is activated by the system.

Constant monitoring of the pulses from the PSS emitter is necessary to keep the printer operating. See "Belt Error Conditions", 15-110.

### Belt Synchronization With System

'Belt UTS' and 'Home Pulse' are sent to the system to indicate that printing can begin when the system and the printer are synchronized. Each character-set on the print belt has a missing timing mark which indicates home position. (Timing marks are raised vertical projections.) The 'Home Pulse' is sent to the system, along with the PSS pulses to synchronize each character on the print belt to the characters in the Universal Character Set Buffer.

A1N2 (ZA035)



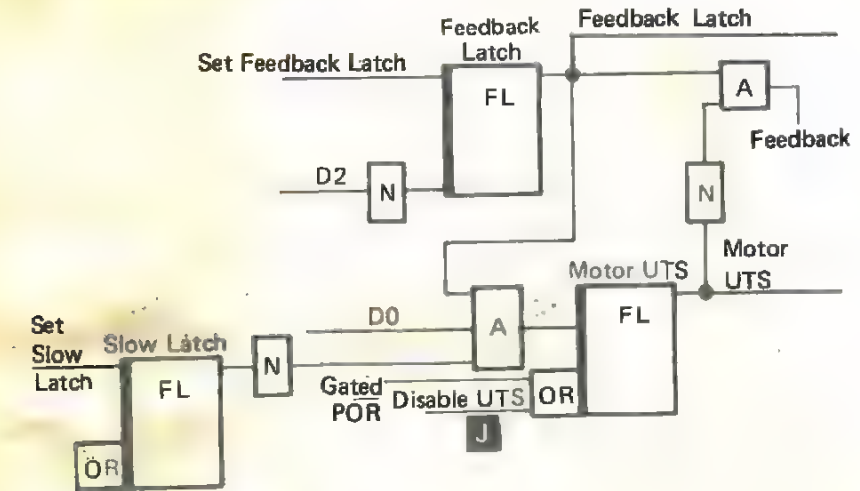
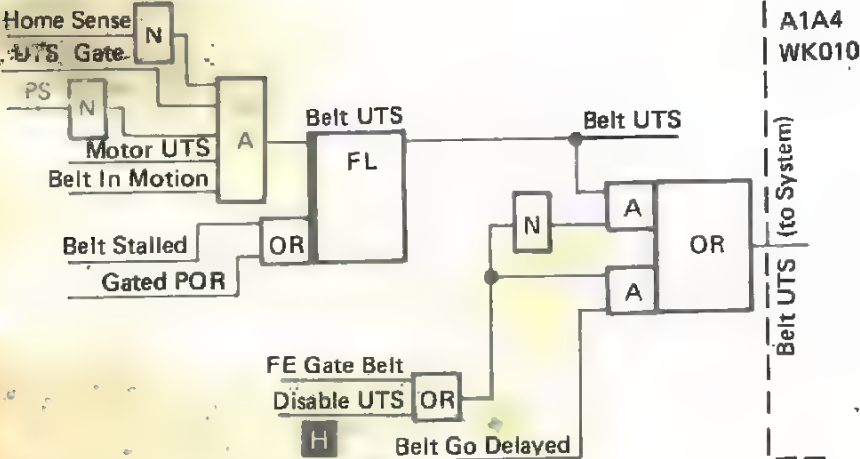


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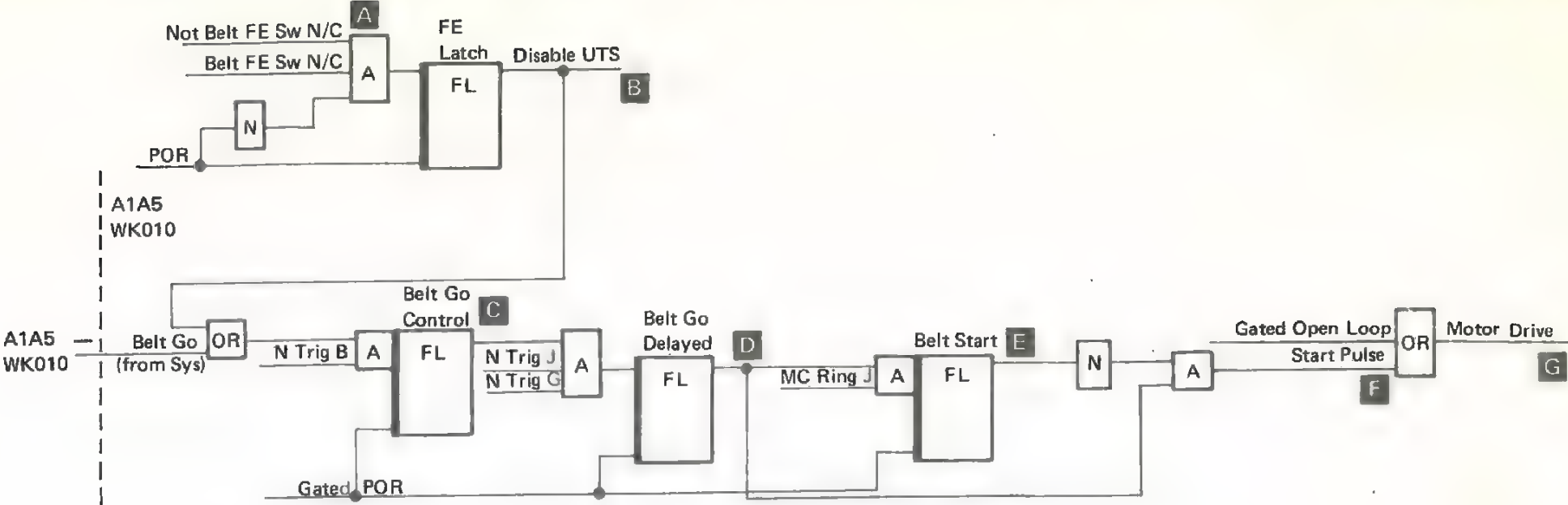


CE Switch Control

CE switch 1 (Belt Go) is provided to test the print belt stepper motor for correct operation. CE switch 1 turns on the FE latch **A** which activates 'Disable UTS' **B**. This turns on the Belt Go Control **C**, Belt Go Delayed **D**, and the Belt Start **E** latches to activate 'Start Pulse' **F** and 'Motor Drive' **G**. The belt drive motor will now run continuously in closed loop mode. (This is the same as normal belt motor start). At the same time 'Disable UTS' degrades 'Belt UTS' **H**, and holds the 'Motor UTS' latch **J** reset.



A1N2 (ZA035)  
Belt Control Card



A1N2 (ZA035) Belt Control Card

PRINT BELT ERROR CONDITIONS

The PSS transducer senses belt timing marks, or the absence of timing marks in the case of 'home'. The PSS pulses are used to monitor the speed of the print belt, to produce 'home' and to produce the PSS pulses. There is a 'home position' (lack of a timing mark) for every 'character set'.

The PSS pulses are used for the following checks:

Error Condition Checks

The following problems cause error conditions, drop 'Ready' and require operator action. (The 'Ready' light comes on and the 'Check' light turns off, after the operator corrects the situation.) If the belt should break, lose speed or run crooked, printer 'Ready' drops. If the belt guide roller wears out, or the transducer of the PSS emitter fails, a sync check occurs and the printer drops 'Ready'.

Belt Up To Speed Check

'Belt Go' drops if the time between 'Belt Go' and 'Belt UTS' is longer than 1.4 seconds. After the error is 'logged' by the system program, a restart is initiated. A second restart with an error drops 'Ready' and requires operator action.

Belt Speed Check

This check drops 'Belt Go' if 'Belt UTS' becomes inactive when 'Belt Go' is active. Power On Reset (POR) is initiated and the DC contactor is dropped. ('Belt Up To Speed' is reset if the belt stalls.)

Belt Sync Check

A missing 'Home' pulse from the PSS emitter, or a mis-timed 'Home' pulse drops 'Belt Go'. This can happen if the belt breaks, or runs too fast or too slow.

Printer Busy Too Long Check

The 'Printer Busy' indication to the system must not exceed 3 seconds during a print cycle, or 'Belt Go' and printer 'Ready' drops.

Printer Busy Too Often Check

A total of three 'Printer Busy' signals during a print cycle drops 'Belt Go' and printer 'Ready'.

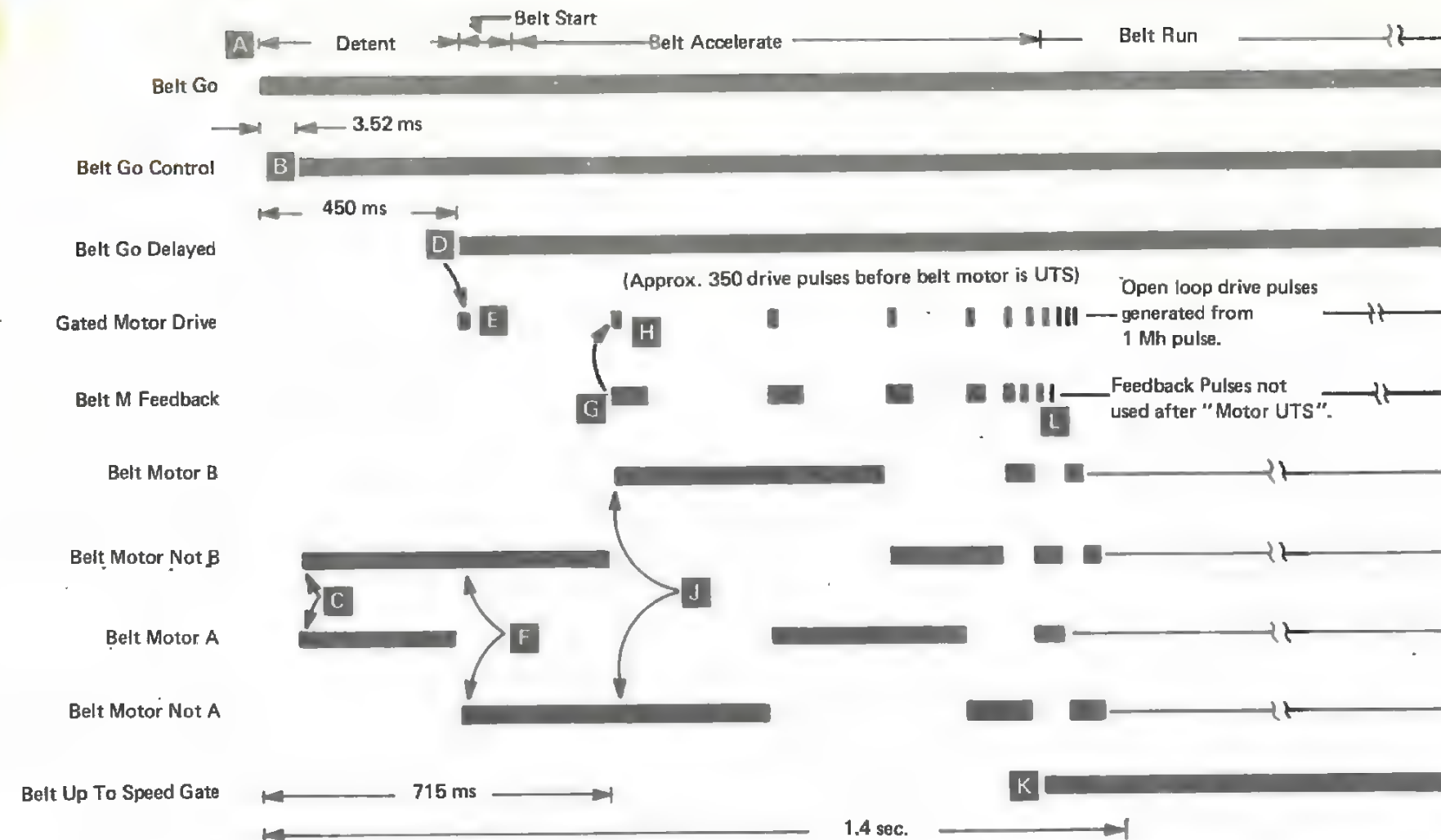


# PRINT BELT MOTOR CONTROL TIMING CHART

## PRINT BELT MOTOR CONTROL TIMING

**Note:** The conditions shown are from a Power On Reset status.

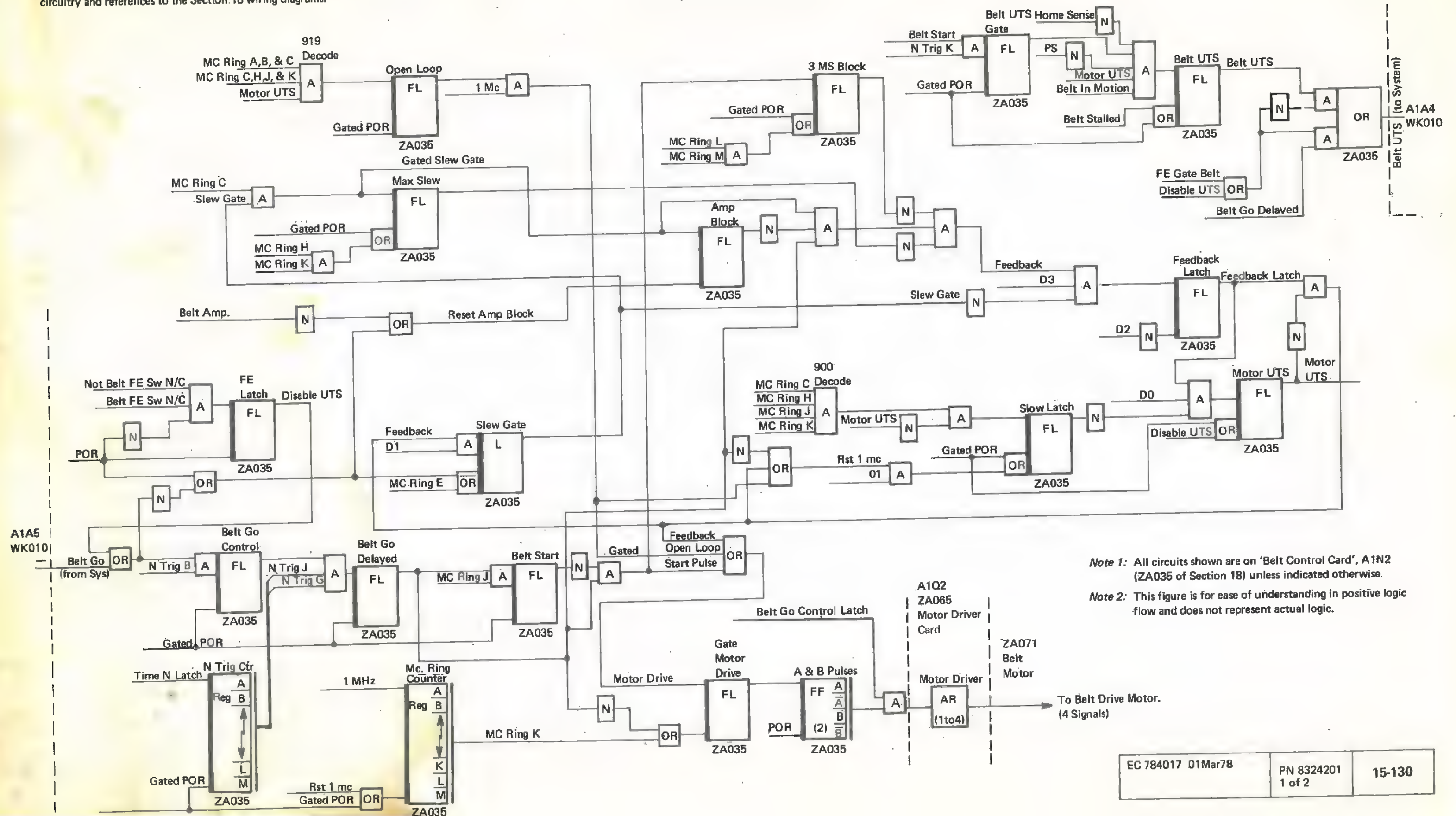
1. 'Belt Go' **A** is sent by the system to start the printer.
2. The Belt Go Control latch is turned on **B** from 1 to 4 ms after 'Belt Go'.
3. 'Belt Go Control' causes 'not A' and 'not B' to be active **C** electrically detenting the stepper motor. (The motor must first detent in order to start on the first advance pulse.)
4. The Belt Go Delayed latch **D** is turned on approximately 450 ms after 'Belt Go Control'.
5. 'Belt Go Delayed' (until 'Belt Start Latch') gives 'Start Pulse' which allows 'Motor Drive' and 'Gated Motor Drive' **E** to the motor driver card.  
The first stepper motor advance pulse is 'A' and 'not B' **F**.
6. As the motor starts to turn, the feedback LED senses the edge of the first hole on the feedback disk and sends back its first pulse **G**. This sets the 'Gated Motor Drive' latch **H**, which produces the next stepper motor advance pulse (B, A) **J**.
7. The 'Belt M Feedback' pulse **G** increases in frequency as the stepper motor speed increases, setting the Feedback latch, which sets the MUTS latch before the 900 decode circuit can set the Slow latch. See "Print Belt Motor Feedback Control", 15-090.
8. Approximately 715 ms to 1.4 seconds after 'Belt Go' is active, 'Belt Up To Speed' becomes active **K**. After 'Belt Up To Speed' is reached feedback pulses are no longer used **L**.





**Note:** The 2nd level diagram shows the Print Belt Motor Control circuitry and references to the Section.18 wiring diagrams.

### A1N2 (ZA035) Belt Control Card



**Note 2:** This figure is for ease of understanding in positive logic flow and does not represent actual logic.



PRINT SUBSCAN (PSS) AND HOME PULSES

Note: For all removals, adjustments and installations, see Section 4, 4-000.

PRINTER SUBSCAN COMPONENTS

Print Belt Timing Marks

The timing marks A are raised marks on the print belt used to generate PSS pulses. The example of one print belt shows 5 marks B for every two characters C.

Transducer

This permanent magnet and coil are used to sense timing marks or timing marks that are missing.

PSS Pulses

The raised timing marks are sensed by the transducer which sends pulses to the electronics gate to generate PSS and 'Home' pulses. (A missing timing mark D creates a 'Home' pulse.)

Synchronization to System

The Home and PSS pulses are used to synchronize the mechanical and the electrical portions of the printing operation. (The print belt is synchronized to the print belt image contained in the adapter.)

PSS EMITTER OPERATION

Print Belt and Belt Guide Roller

The print belt moves counterclockwise between the transducer E and a belt guide roller F. Tension from the idler pulley keeps the belt against the belt guide roller. The belt drives the roller by friction to prevent wear. The belt guide roller allows the belt to run smoothly, and also acts as a backstop for transducer adjustments. The transducer is adjusted close enough to the print belt timing mark to be able to sense the timing marks, but not wear the timing marks or the transducer G. See "Print Subscan Transducer-Service Check", Section 4, 4-000, for adjustments.

Transducer and Amplifier

The transducer is energized as each raised timing mark on the print belt passes the transducer. At print speed, the timing marks generate pulses through the transducer coil H to the amplifier J. The belt control card K looks at 'Early Emitter' to provide 'PSS' and 'Home' L pulses to the system at the correct time, once Belt UTS M has been reached. (See "Belt Up To Speed," Section 15-090.)

PSS AND HOME PULSES DEVELOPMENT AND USE

PSS Pulses

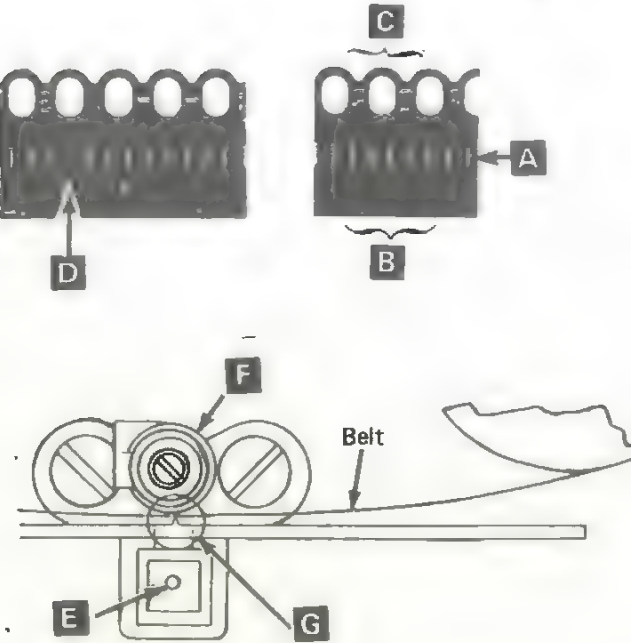
The print belt emitter output (a 1300 MV, peak-to-peak waveform) is sent to the amplifier card. A 'Time N' latch emits a pulse to synchronize the outputs of 'early', 'raw' and 'pure emitter' to obtain a PSS pulse and 'Home time'. The PSS pulses are sent continuously to the system. 'Home' pulse is sent only when there is a missing timing mark.

The print belt emitter output is amplified N and sent to the Belt Control Card as 'Early Emitter'. The line 'Early Emitter' sets an Early Emitter latch O, which in turn is used to set the Raw Emitter latch. As shown at P, the Raw Emitter latch is active later than 'Early Emitter' O to prevent extra input from the print belt emitter amplifier. (If random noise enters during the time shown at Q, it will not be passed on because of this difference of turn-on times of the latches.)

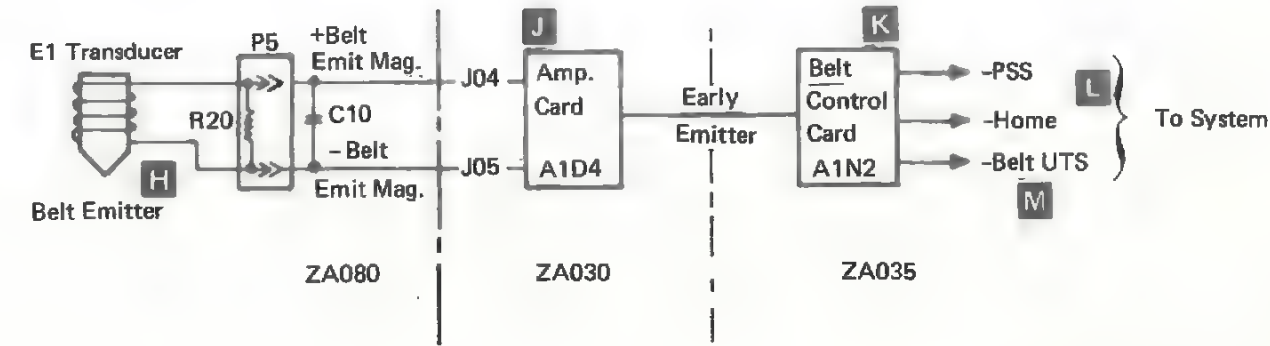
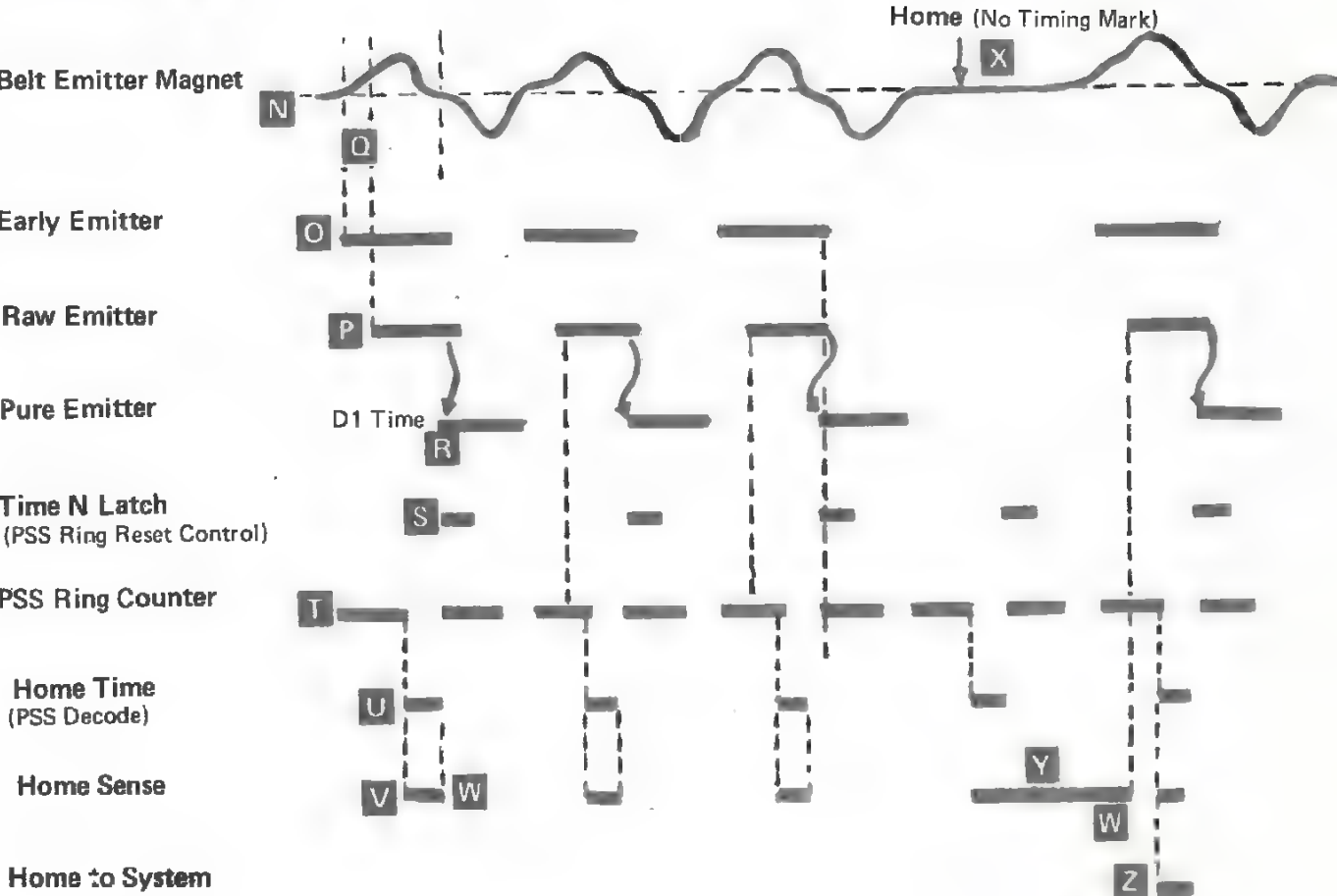
Home Pulse and Synchronization

Upon the fall of the Raw Emitter latch and the next 'D1' time, Pure Gate latch is set. This activates the Pure Emitter latch and synchronizes 'Pure Emitter' R to the electronics clock.

The Time N latch S and the PSS Ring Counter T are used for timing and control. 'Time N' occurs from D1 time to the following D0 time. Home time U is a decode of the PSS Ring. It turns on the Home Sense latch V, which resets when 'Raw Emitter' turns on W.



However, at 'Home Time' X, when a timing projection is not present, 'Early Emitter' and 'Raw Emitter' are not set. Because 'Raw Emitter' normally resets 'Home Sense' but is now absent, 'Home Sense' stays active Y. 'Home Sense' allows 'Home' to synchronize the system to the print belt Z.





PRINT UNIT AND HAMMERS

PRINTING COMPONENTS

Hammers

The 5211 Printer has 132 print positions with either 66 (model 1) or 132 (model 2) hammers.

Subscans

A subscan is the time required to option every tenth print position to every fourth print belt position (model 1); or every fifth print position to every other print belt position (model 2). Five subscans make one print scan. (This is a function of the CPU or the using system.)

Print Scans

On a model 1 a print scan is the time required to option one character to every odd print position or every even position. On model 2 the print scan is the time required to option one character to all print positions.

Print line

Each character of a print belt is optioned to print every print position. Therefore, a 48-character-set belt would have a print line of:

- 48 odd and 48 even print scans for model 1
- 48 total print scans for model 2

Universal Character Set Buffer (UCSB)

This is a buffer, in the system, which stores the image of the characters on the print belt. The buffer must be reloaded if the print belt is changed. (This is a function of the CPU or the Host System.)

Print line Buffer (PLB)

This buffer stores the image of the line to be printed. (This is a function of the CPU or the Host System).

Forms Thickness and Impression Control

This control mechanically adjusts the platen for throat clearance and changes an impression control potentiometer to vary the duration of the hammer-fire pulse. See "Impression Control Single Shot", 15-160.

Addressing

Hammer latches are addressed when the character on the print belt matches the character to be printed from the Print Line Buffer and the character is aligned with the correct print position. The latches are turned on by an 8-byte (plus parity) addressing scheme from the system.

Firing the Hammers

Hammers are fired if their hammer latches have been set approximately 1½ subscans prior to the print time. ('Fire Tier' lines control the 'hammer on' time.)

Error Checking

Print operation monitored by 'Data Parity Check', 'Hammer Echo Check', and 'Any Hammer On Check'.

PRINT UNIT CASTING

Platen

The platen on the 5211 printer is adjustable to allow for multipart forms. The forms thickness control **A** is set from 1 through 6, depending on the total forms thickness. The bar extending to the left **B** operates a cam and roller assembly which moves the platen closer to, or farther away from the hammers.

Forms Thickness Control

The movement of the forms thickness control also adjusts the Impression Control Potentiometer by sliding a pin in the slot at **C**. This turns the arm attached to the potentiometer **D**, thereby changing the value from the potentiometer. This potentiometer determines the pulse width from the Impression Control Single Shot. See "Impression Control Single Shot", 15-160.

HAMMER UNIT

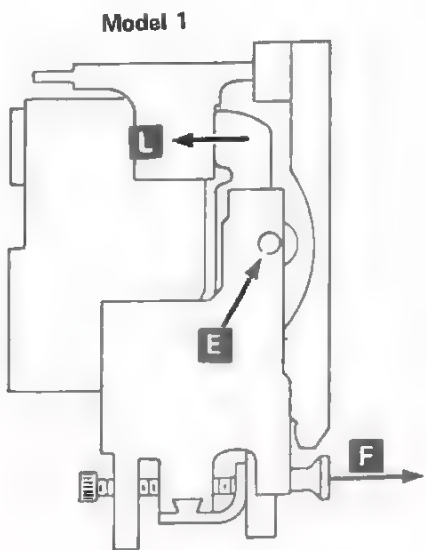
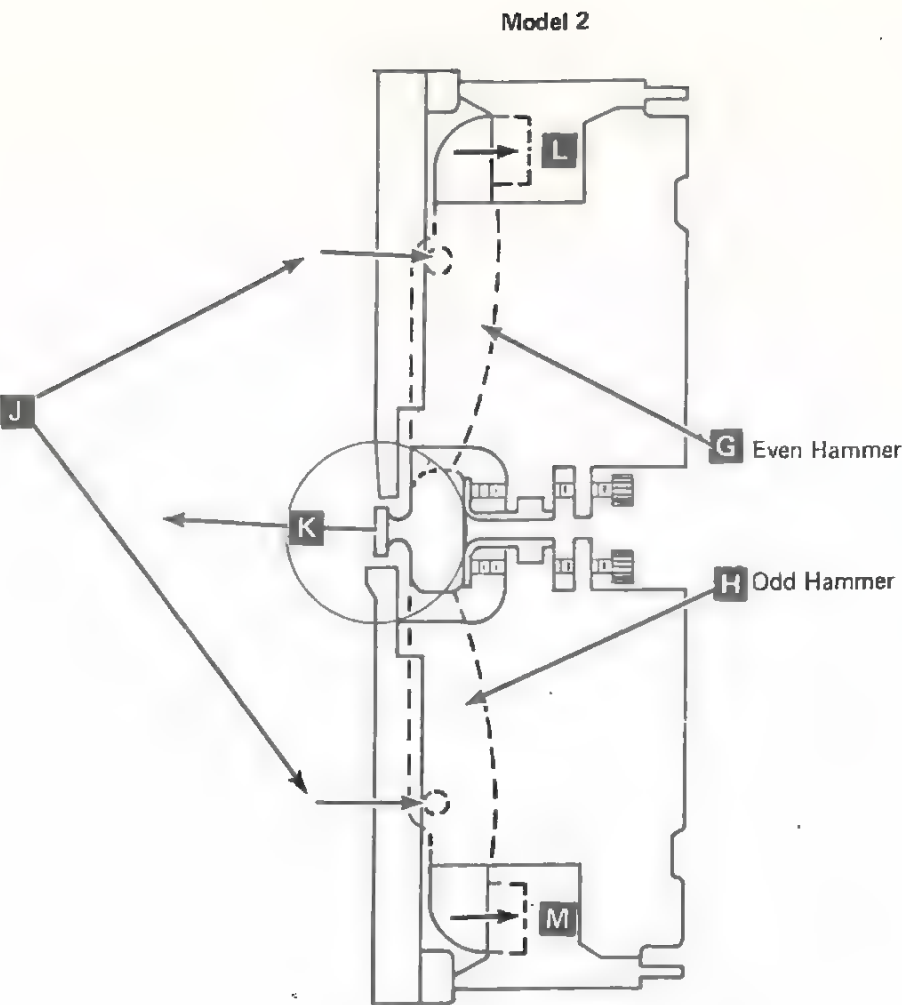
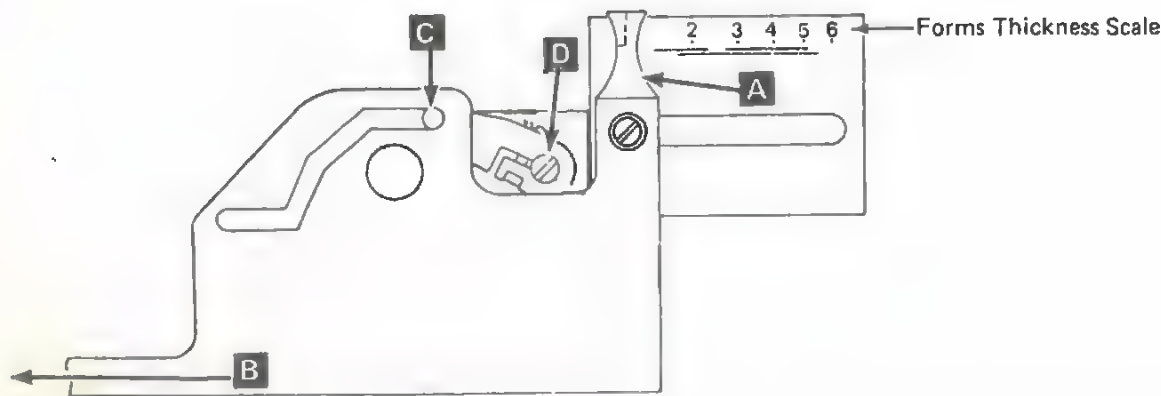
Hammers

Model 1 - The hammer, pivoting at **E** is forced toward the platen, as shown by the arrow **F**.

Model 2 - The even (top) **G** and the odd (bottom) **H** hammers pivot at the points shown by the arrows **J** and **K**. The hammers move toward the platen as shown.

Hammer Coils

The coils on both Model 1 and Model 2 are such that the winding goes around the axis of the coil and the tail of the hammer. It is attracted into the center of the coil as shown at **L** and **M**.





THEORY OF PRINTING

Print Mechanism

The print belt is an endless steel band that is 1219.2 mm (48.0 in) long, and has 192 raised characters (for Models 1 and 2). While the belt is continuously moving, printing can only occur when a known character is aligned with the correct hammer position. The timing or alignment of the correct character with a print position is synchronized by the printer sending the 'Home' and 'PSS' pulses to the system, which controls the print time.

Home Pulse

The Home Pulse is generated 1½ subscans before hammer number one can be fired to print the first character in print position number one. Therefore, optioning a hammer to print occurs 1½ subscans before the printing occurs. If the missing timing mark (home) is lined up with the print belt emitter, numerical character 1 is slightly to the right of print position one. By the time the hammer is fired, character 1 and print position one are both electronically and mechanically aligned when the character is to be printed.

Print Subscans

The print subscan pulses electronically divide the print belt character spacing into 5 parts, called fire tiers or subscans **A**. The subscans are generated by the printer during each complete print scan period. A print scan is the time interval between the alignment of a sequence of belt characters at print position one. During one print scan, all print positions will have been optioned to one character.

Impression Control Single Shot

The forms thickness control mechanically adjusts the print mechanism forward or back for different form thicknesses. The control also adjusts a potentiometer that varies the width of the image control single shot pulse. As the print mechanism is adjusted for thicker forms, the pulse width is also increased. **B** The pulse width can vary from 251 ms, for single part form, to 523 ms for 6 part forms. The width of the single-shot pulse determines the width of the fire tier pulses. **C** The variable times are shown in shaded areas.

PRINTING

Printing Sequence - Model 1

The relationship of hammer pitch to print belt pitch results in a printing sequence such that at any one subscan every tenth print position and every fourth type element are aligned. Starting with print position one, this electronic sequence continues until all the hammers to be selected during each subscan have had the option of firing. Because the Model 1 print hammers each span two print positions, the odd positions **D** are scanned during the passage of one array of characters and the even positions **E** are optioned

during passage of the second array. Two sets of characters must pass the print line to ensure printing of a full line. A delay of 15 subscans (10.35 ms nominal) must be allowed for hammer settling **F** before the even positions can be optioned for firing during the passage of the second array

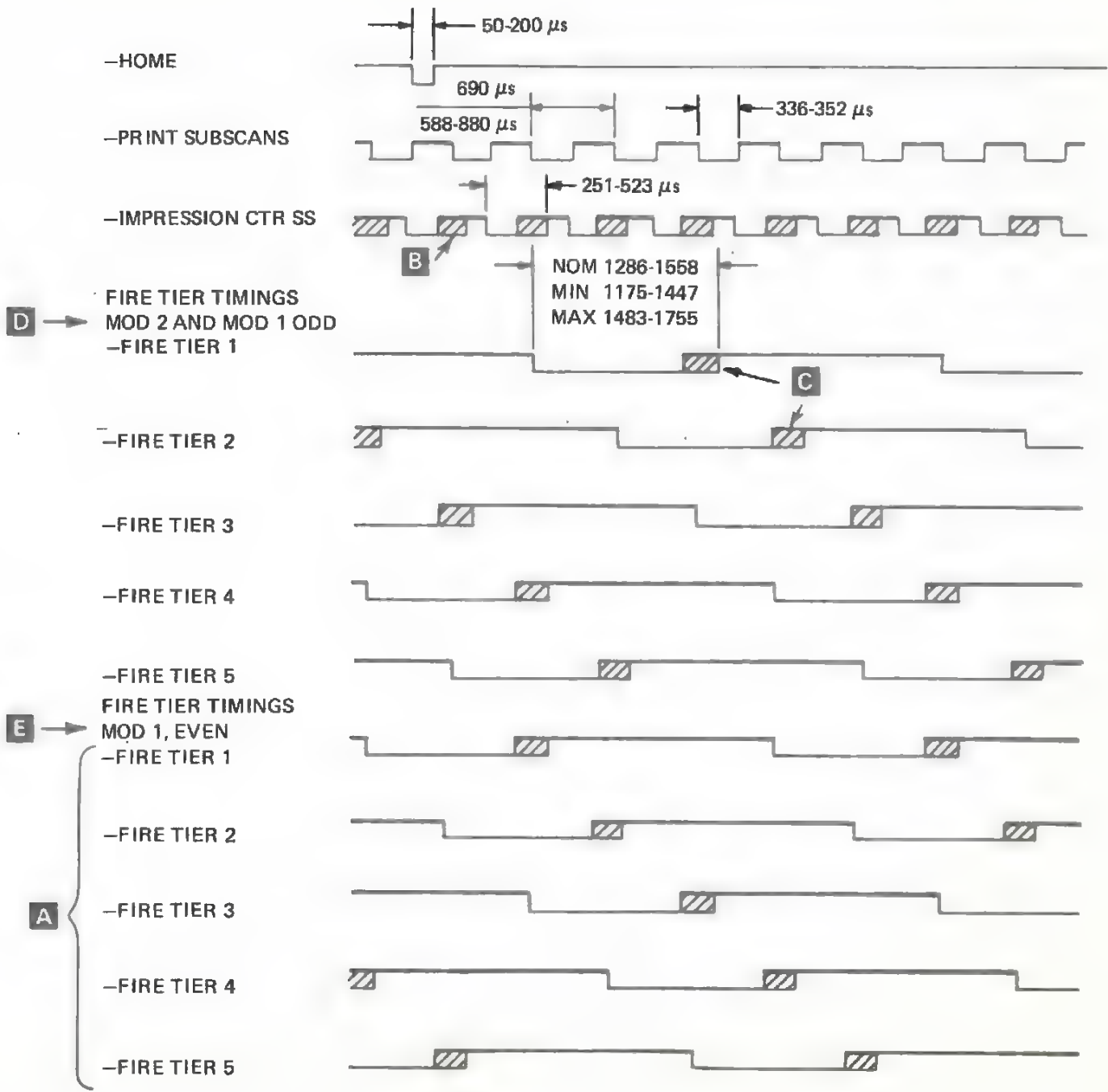
The following is an example of the sequence of character/print options occurring in the odd scan or 5 subscans.  
Subscan 1 - Print Positions 1, 11, 21, 31, etc., optioned respectively to characters 1, 5, 9, 13, etc.  
Subscan 2 - Print Positions 3, 13, 23, 33, etc., optioned respectively to characters 2, 6, 10, 14, etc.  
Subscan 3 - Print Positions 5, 15, 25, 35, etc., optioned respectively to characters 3, 7, 11, 15, etc.  
Subscan 4 - Print Positions 7, 17, 27, 37, etc., optioned respectively to characters 4, 8, 12, 16, etc.  
Subscan 5 - Print Positions 9, 19, 29, 39, etc., optioned respectively to characters 5, 9, 13, 17, etc.  
During one odd print scan, all odd print positions have been given an option at one character of a given set. The maximum number of scans required to print all odd characters equals the character set size.

Printing Sequence - Model 2

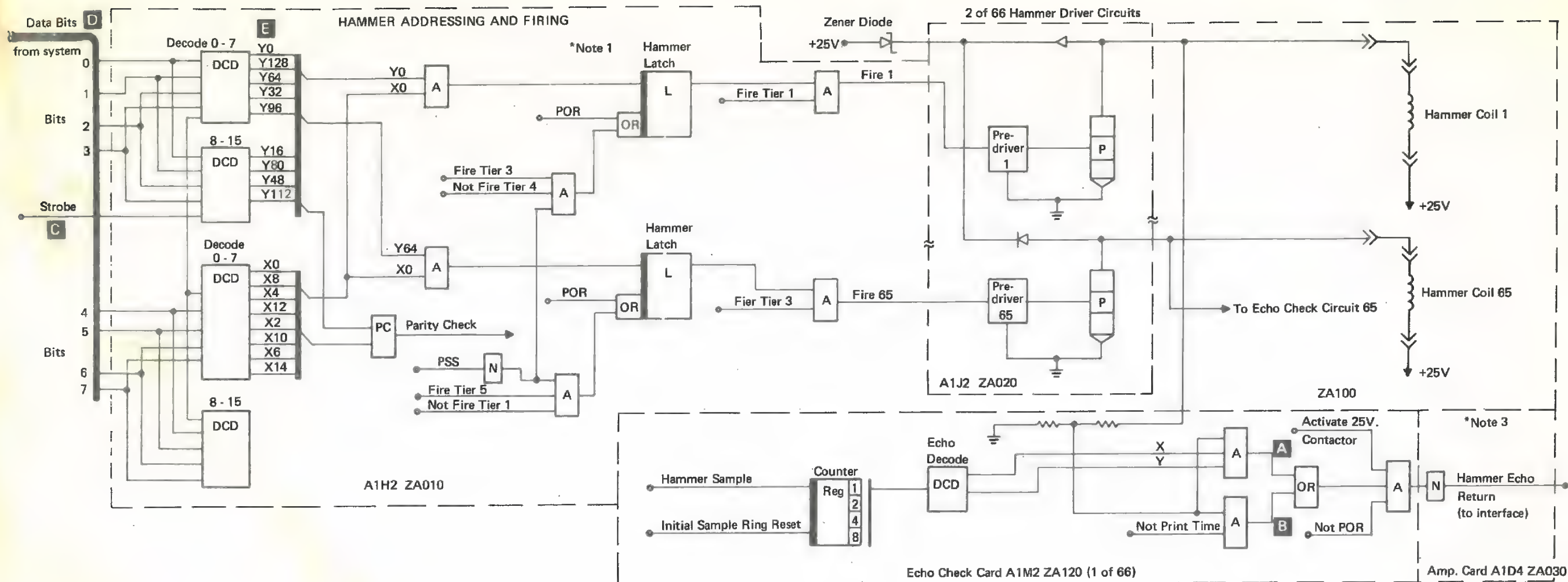
The relationship of the distance between hammers to the distance between each character on the belt results in a printing sequence such that in any one subscan every fifth print position and every second type element are aligned. Starting with position one, this sequence continues until all the hammers to be selected during each subscan have had the option of firing. One full character set must pass print position one to ensure that all positions have been optioned to print.

The following is an example of the sequence of character/print options occurring in one scan or 5 subscans.  
Subscan 1 - Print Positions 1, 6, 11, 16, etc., optioned respectively to characters 1, 3, 5, 7, etc.  
Subscan 2 - Print Positions 3, 8, 13, 18, etc., optioned respectively to characters 2, 4, 6, 8, etc.  
Subscan 3 - Print Positions 5, 10, 15, 20, etc., optioned respectively to characters 3, 5, 7, 9, etc.  
Subscan 4 - Print Positions 2, 7, 12, 17, etc., optioned respectively to characters 4, 5, 8, 10, etc.  
Subscan 5 - Print Positions 4, 9, 14, 19, etc., optioned respectively to characters 5, 7, 9, 11, etc.  
The maximum number of scans required to print all characters equals the character set size.

PRINT TIMING – MODEL 1, 2 (ON MODEL 1 ALLOW 15 SUBSCANS FOR HAMMER SETTING **F** BETWEEN ODD AND EVEN SCANS 10.35 ms NOMINAL)







**Note 1:** This figure is for ease of understanding the Model 1; in positive logic. It does not represent actual logic.

**Note 2:** This chart represents the actual hammer decode lines.

**Note 3:** **A** Any Hammer On Check - an output when not print time.

**B** Hammer Echo Check - any incorrect output during print time.

#### Data Strobe

'STROBE' **C** is supplied by the using system and is used by the printer to validate the data bus transmitted by the host system. Data must be made active on the bus 0.6 microseconds minimum before strobe is made active. Data must remain active for 0.6 microseconds minimum after strobe is made inactive.

#### Hammer Fire Timing

The 5211 Printer Hammer Fire sequence uses a strobed 8 bit **D** interface plus a parity bit from the using system to determine which hammers are to be fired in each subscan or tier. The 8 bit interface is a transmission of the actual print position to be fired.

The 'Print Position' must be sent by the using system within 1.5 subscans prior to actual firing. The printer senses which hammer latches are to be turned on by decoding the Data Bits. **E** The system then provides 5 'Fire Tier' lines which determine the actual On time (including the impression control SS line - see 15-160) for each of the 5 Tiers. Any hammer whose latch was set on previously in that subscan, will be fired during this Fire Tier Time. The hammer Latch will be turned off by the printer within 3.5 subscans after it was turned on. Because the fire tier lines are used to generate resets to the hammer latches, the fire tier signal lines are active whenever the belt is running and not active when the belt is not running.



MODEL 1 - TYPE SELECTION

Subscan, Print Belt, and Print Position Relationship (Model 1)

- 1. Line 1 represents a portion of the hammer mechanism (hammers 1-10).
- 2. Line 2 represents print positions 1-20 printed by hammers 1-10.
- 3. Line 3 represents timing marks on the print belt. The solid marks are etched marks on the belt and the dotted marks are the electronically inserted pulses produced by the printer circuit. The first timing mark shown is an etched mark followed by three dotted marks. The center dotted mark is equivalent to the home pulse (absence of a timing mark pulse). This dotted mark is also subscan five, followed by subscan one, two, etc.
- 4. Line 4 represents the print belt and the relationship of the characters to the print positions in line two above.
- 5. The remaining lines indicate print belt sequence and the position of the characters in the scanning process.

The five subscans represent either odd or even print positions. To match a character to a subscan, align the character with one of the print positions: When it aligns with a print position, the column on the left (SS1 to SS5) shows on which subscan the character is printed. The character is optioned to print on the previous subscan. Even print positions are optioned and printed on even scans; odd positions are optioned and printed on odd scans.

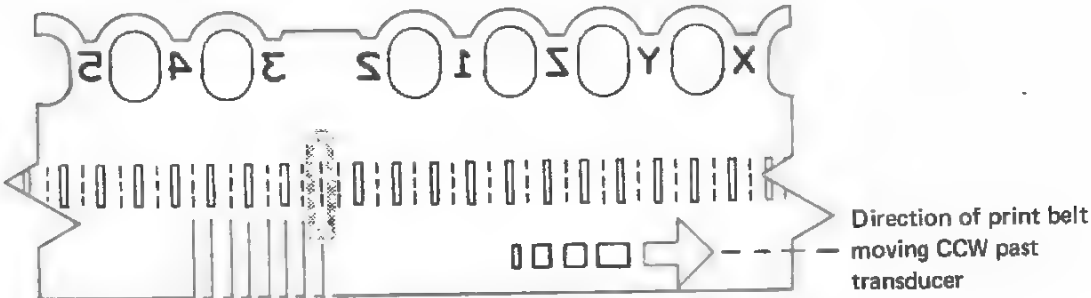
Examples:

- 1. Character 2 in line 6 is printed in SS3 but optioned in SS2 (odd print position, odd scan).
- 2. Character 6 in line 8 is printed in SS5 but optioned in SS4 (even print position, even scan).

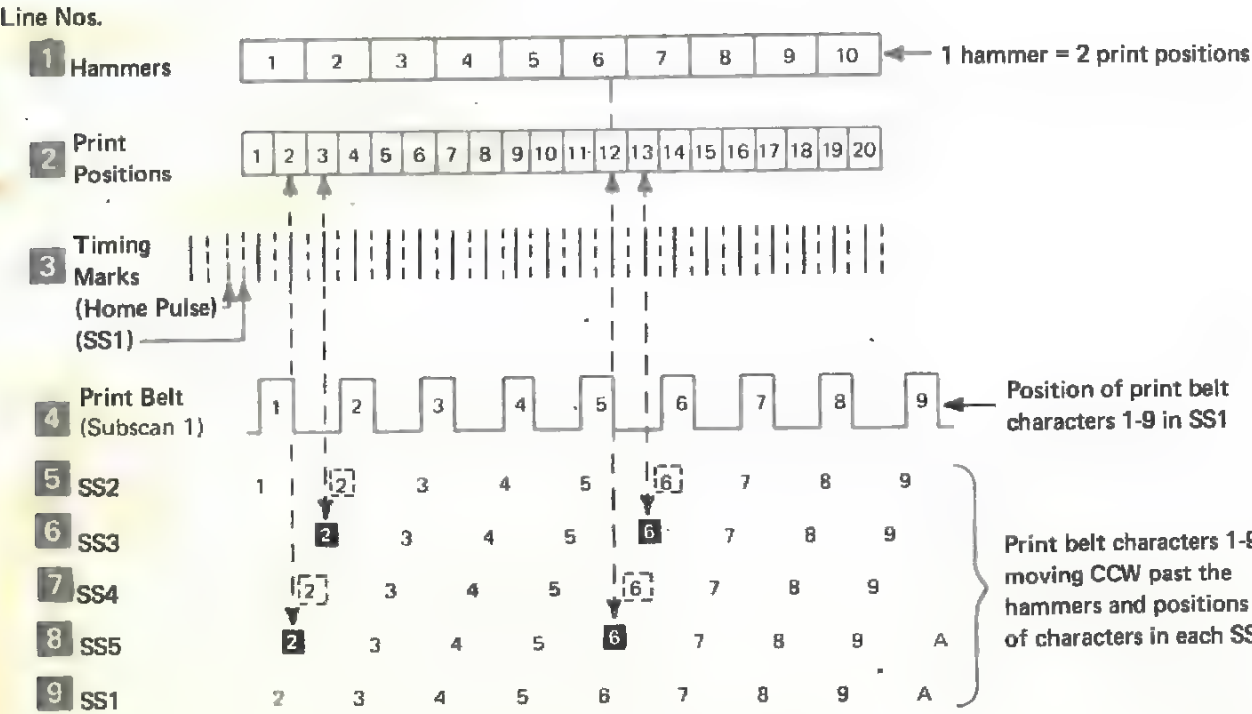
Note that every tenth position is aligned to print; for example: 1, 11, 21 etc., 2, 12, 22 etc.

Scanning Sequence (Model 1)

The figure shows the print belt passing the transducer and the sequence of scanning, starting after home pulse. Each set of scans is repeated until all characters on the print belt have been optioned to print in each print position. For a 48 character-set print belt, there are 96 print scans: 48 even and 48 odd, plus three between odd and even scans, for hammer settling:



- Odd Subscans**
- Home Pulse position (used also as subscan 5)
  - SS1—Option PP 1 with 1
  - SS2—Fire PP 1, option PP 3 with char. 2
  - SS3—Fire PP 3, option PP 5 with char. 3
  - SS4—Fire PP 5, option PP 7 with char. 4
  - SS5—Fire PP 7, option PP 9 with char. 5
  - SS1—Fire PP 9, option PP 1 with char. 2
  - SS2—Fire PP 11, option PP 3 with char. 3
- Even Subscans**
- SS1—Option PP 6 with char. 3
  - SS2—Fire PP 6, option PP 8 with char. 4
  - SS3—Fire PP 8, option PP 10 with char. 5
  - SS4—Fire PP 10, option PP 2 with char. 2
  - SS5—Fire PP 2, option PP 4 with char. 3
  - SS1—Fire PP 4, option PP 6 with char. 4





MODEL 2 - TYPE SELECTION

Subscan, Print Belt, and Print Position Relationship (Model 2)

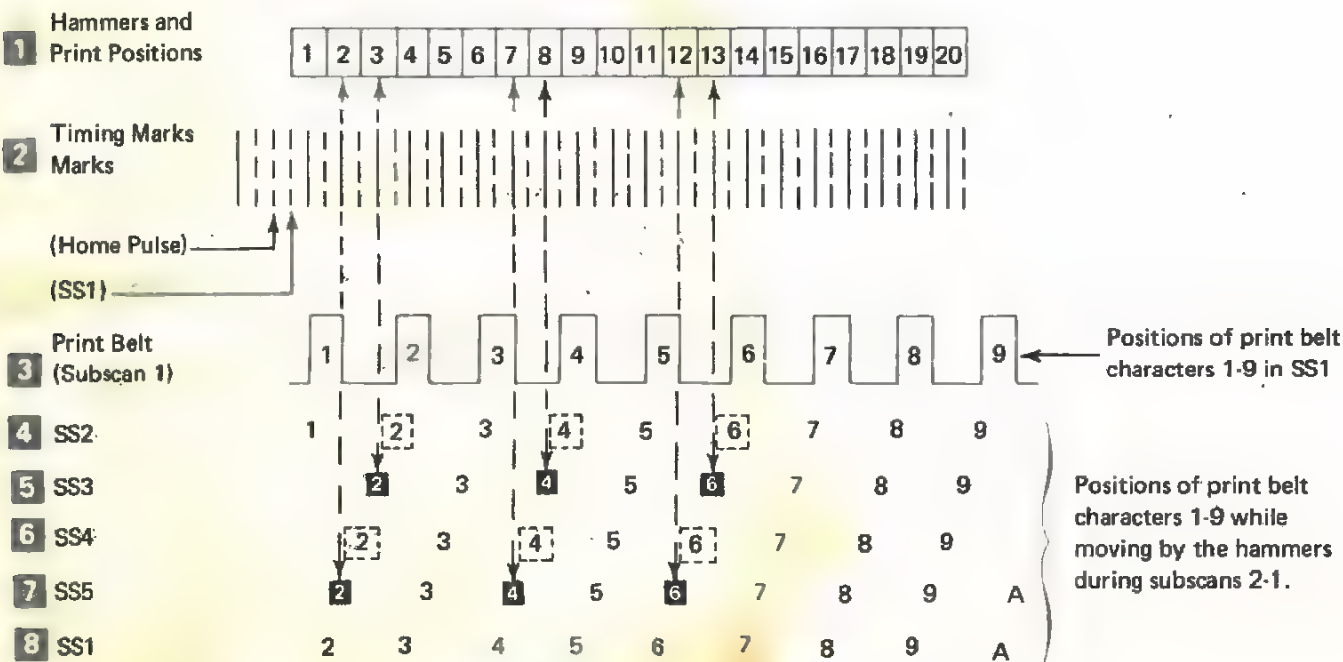
- 1. Line 1 represents print positions 1-20 printed by hammers 1-20.
- 2. Line 2 represents timing marks on the print belt. The solid marks are timing marks on the belt and the dotted marks are the electronically inserted pulses produced by the printer circuits. The first timing mark shown is followed by the three dotted marks. The center dotted line is the same as to the home pulse (absence of a timing mark pulse). This dotted mark is also subscan five, followed by subscan one, two, etc. (SS1, SS2).
- 3. Line 3 represents the print belt and the relationship of the characters to the print positions in line 2 above.
- 4. The remaining lines indicate print belt sequence and the position of the characters in the scanning process.  
To match a character to a subscan, align the character with one of the print positions above. When it aligns with a print position, the column on the left (SS1 to SS5) shows on which subscan the character is printed. The character was optioned to print on the previous subscan.

Examples:

- 1. Character 2 in line 5 is printed in SS3, but was optioned in SS2.
- 2. Character 6 in line 7 is printed in SS5, but was optioned in SS4.

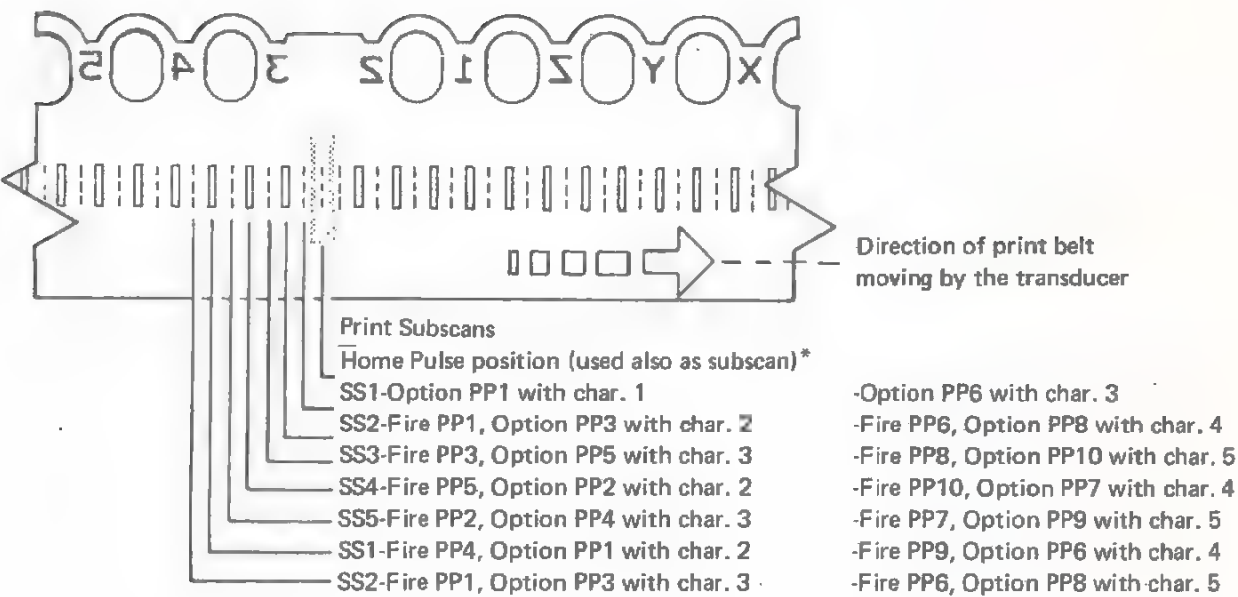
Note that every fifth position is aligned to print; for example:  
1, 6, 11, 16, 21, 26, etc.,  
2, 7, 12, 17, 22, 27, etc.

Line Numbers



Scanning Sequence (Model 2)

The figure shows the print belt passing the transducer and the sequence of scanning starting after home pulse. Each set of scans is repeated until all characters on the print belt have been optioned to print in each print position. For a 48-character-set print belt, there are 96 print scans. 48 even and 48 odd, plus 3 between odd and even scans for hammer settling.









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RIBBON

INTRODUCTION

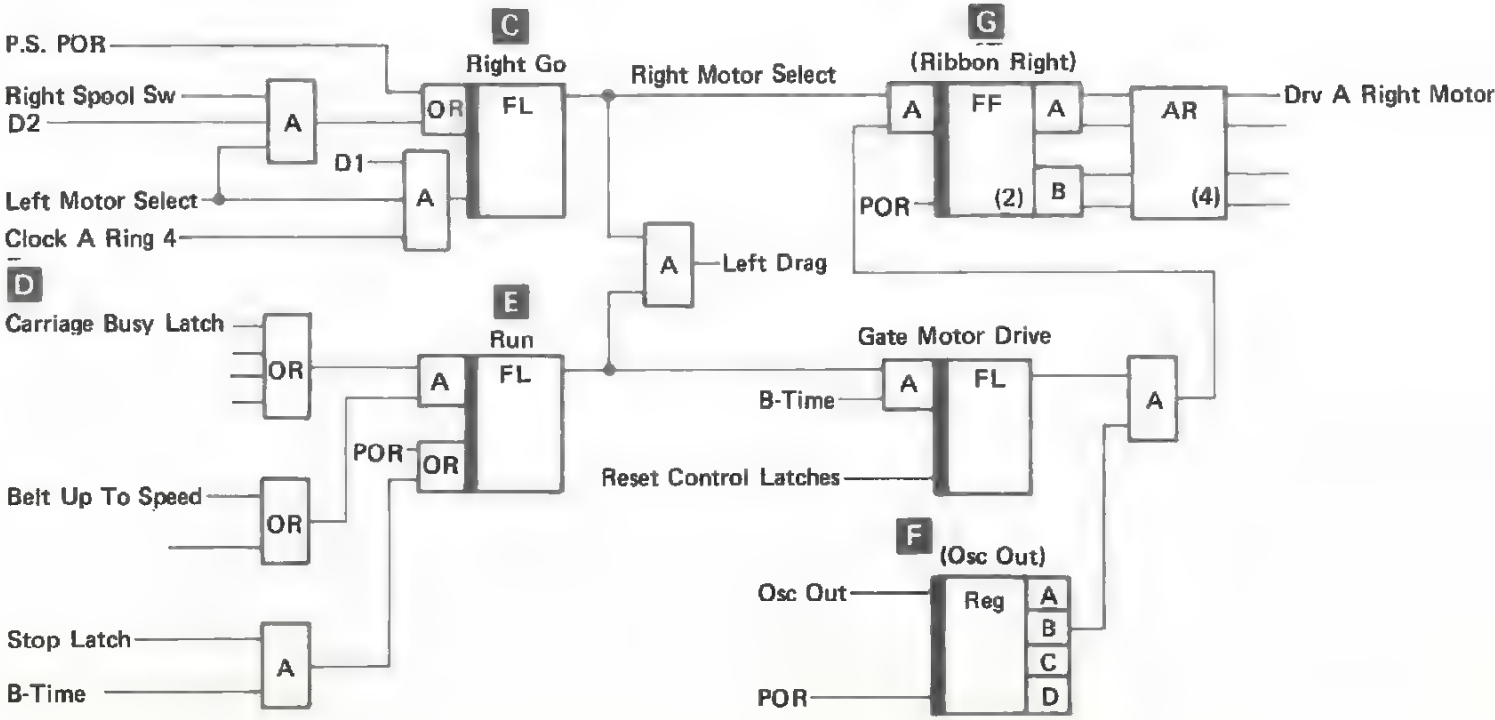
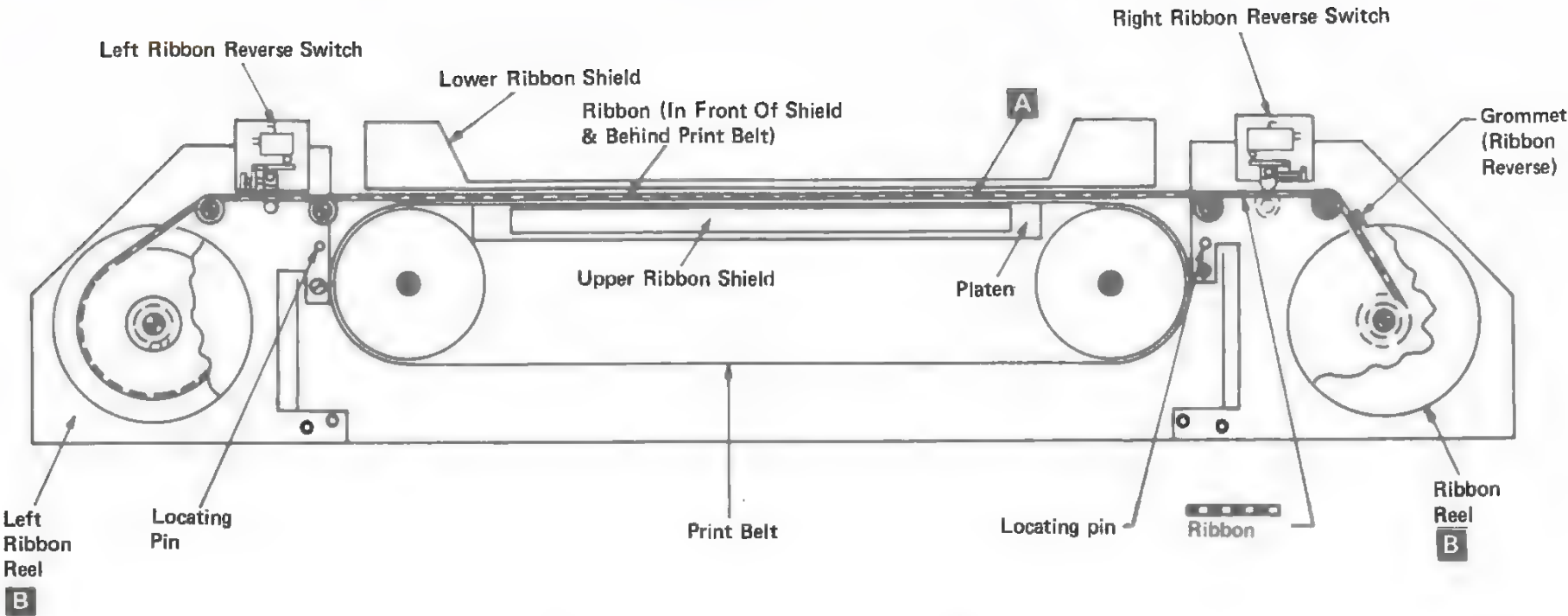
The ribbon is mounted in the printer so that it goes between the print belt and the forms **A**. Mounted under each ribbon reel **B** is a stepper motor that drives the ribbon either left or right. A drag signal is applied to the motor that is not being driven to keep tension on the ribbon. Ribbon motion always starts before a printing cycle and stops soon after printing is completed. Automatic ribbon reversal is accomplished whenever a ribbon reel is nearly empty.

RIBBON DRIVE

The Right Go latch **C** is always activated after a 'P. S. POR' is applied. This latch selects the right motor drive circuit. There is no ribbon movement, however, until a 'Carriage Busy Latch' signal **D** is received. This signal is active following a 'Carriage Go' from the system and remains active until after the carriage has stopped. 'Carriage Busy Latch' sets the Run latch **E** if the belt is up to speed. The outputs from the Run latch and the Right Go latch are ANDed to develop the 'Left Drag' signal. When the Run latch is active, Gate Motor Drive latch is activated with 'B-Time'.

The frequency and duration of the drive pulses to the ribbon motor are determined by the signal coming from the Osc Out register **F**. The input to this register is developed within the ribbon circuit. The decode of the speed register (15-240), establishes the time on the 'Osc Out' line so the drive pulses to the drive motor occur every 6.144 milliseconds or 167 times per second. The decode can also be set by activating the 'Low Speed Select' line (15-240), to change the motor drive to 122 steps per second.

These pulses are used to establish the condition of the A and B outputs from the two flip flops that make up Ribbon Right **G**. The four outputs from these flip flops are fed through drivers and are sent to the right drive motor. The pulses continue to be developed and the ribbon continues to run as long as the Run latch remains active and POR has not been recieved.





## RIBBON STOP

The output from the Gate Motor Drive latch activates the Start Time Out latch **A** with 'C-Time', 22 milliseconds after Gate Motor Drive latch is activated (with 'B-Time'). Allow Check latch **B** is then activated and also a signal is sent to the input circuit of the Allow Stop 1 latch **C**.

Allow Stop 1 latch is activated at 'D1' time, provided 'Set Run Latch' line is not active. Typically this would be as soon as 'Carriage Busy Latch' becomes inactive. With Allow Stop 1 latch active and Allow Stop 2 latch not active, the BC Time Counter **D** is reset to 'B-Time' inactive, which in turn resets 'C-Time' to inactive.

At D3 time 'Allow Stop 2' is activated and sends a signal to the input circuit of Stop latch. Because Allow Check latch is active, Stop latch becomes active when 'C-Time' becomes active again. The 'Stop Latch' line is combined with 'B-Time', to reset the Run latch and deactivate the 'Run Latch' line **E**. When the 'Run Latch' line is not active all ribbon motion stops and the control latches are reset with the reset line **F**.

## RIBBON REVERSAL

When the left ribbon reel is nearly empty a grommet on the ribbon pushes against and closes the left ribbon reverse switch and activates the 'Left Spool Sw' line **G**.

'Right Motor Select' **H** is still active when the 'Left Spool Sw' signal becomes active, so Left Go latch energizes at D0 time developing the 'Left Motor Select' line **J**.

At this time both the 'Right Motor Select' and 'Left Motor Select' lines are active so steps are taken to temporarily stop the ribbon and stop incoming print data during this reversal time.

When both select lines are active, the 'Reset Control Latches' line **F** and the Busy latch **K** are activated. The 'Reset Control Latches' line resets the timing (N-Time Counter) **L** and resets the Gate Motor Drive latch which prevents pulses from the 'Osc. Out Latch' line **M** from being sent to drive the ribbon motors.

When Busy latch **K** is active, a 'Printer Busy' signal is sent to the system preventing any print information from being sent to the printer.

After the 'Left Motor Select' line becomes active, it is gated through an AND at a portion of 'D1' time (as a result of 'Clock A Ring 4') and deactivates the Right Go latch **N**.

When the N-Time Counter reaches '20 Time' (about 11 milliseconds), 'B-Time' is activated and the Gate Motor Drive latch becomes active again.

Left drive pulses are now developed the same as described in "Ribbon-Drive" (15-220) and the direction of the ribbon is reversed.

The Busy latch **K** is deactivated with 'C-Time' about 22 milliseconds after 'B-Time' is active, thus signalling the system that the printer is ready to receive print data again.

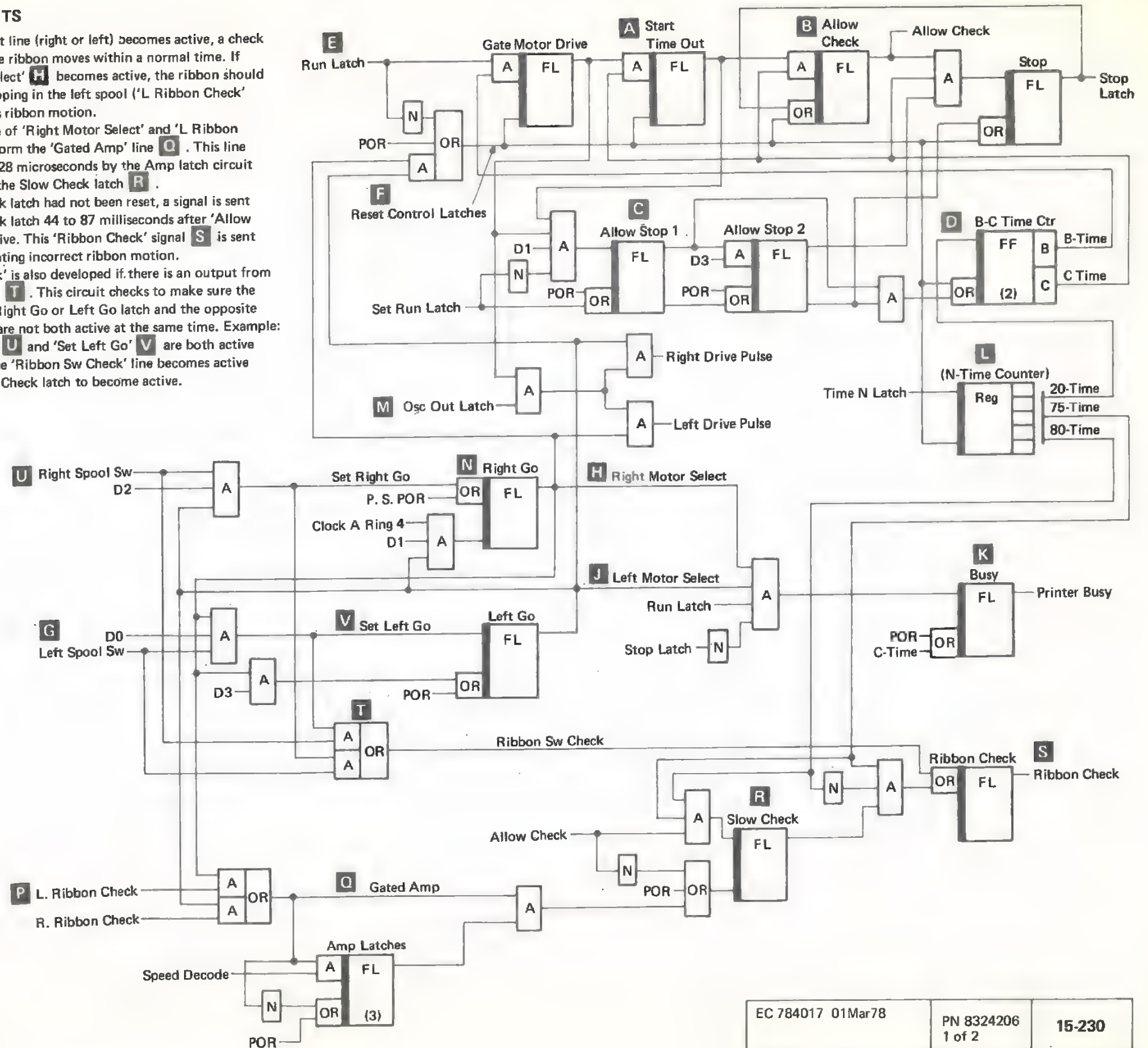
## CHECK CIRCUITS

When a ribbon select line (right or left) becomes active, a check is made to assure the ribbon moves within a normal time. If the 'Right Motor Select' **H** becomes active, the ribbon should move a signal developing in the left spool ('L Ribbon Check' **P**) that indicates ribbon motion.

The combination of 'Right Motor Select' and 'L Ribbon Check' in an AND form the 'Gated Amp' line **Q**. This line is delayed at least 128 microseconds by the Amp latch circuit and is sent to reset the Slow Check latch **R**.

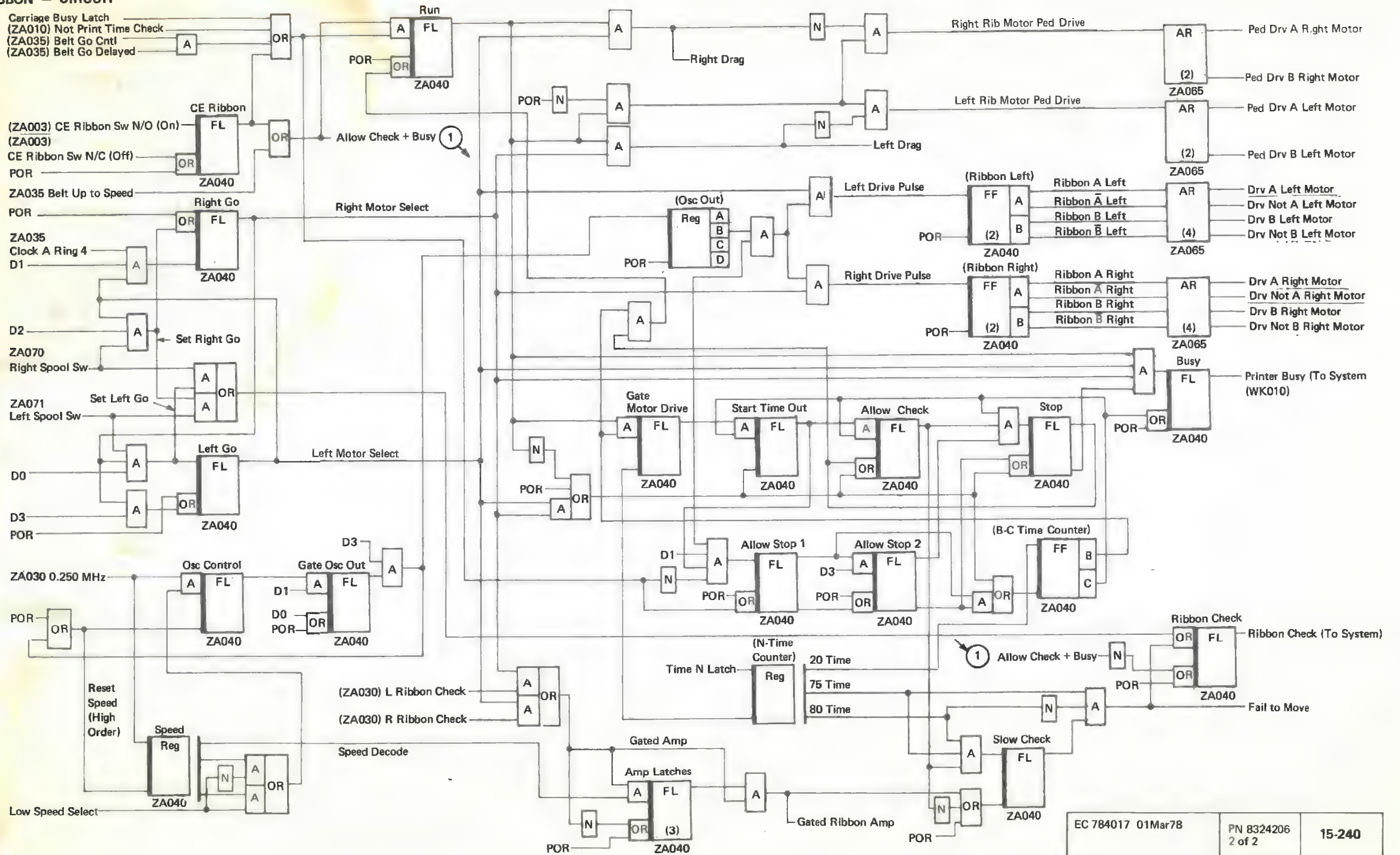
If the Slow Check latch had not been reset, a signal is sent to the Ribbon Check latch 44 to 87 milliseconds after 'Allow Check' becomes active. This 'Ribbon Check' signal **S** is sent to the system indicating incorrect ribbon motion.

A 'Ribbon Check' is also developed if there is an output from the compare circuit **T**. This circuit checks to make sure the set line to either a Right Go or Left Go latch and the opposite spool switch-signal are not both active at the same time. Example: If 'Right Spool Sw' **U** and 'Set Left Go' **V** are both active at the same time, the 'Ribbon Sw Check' line becomes active causing the Ribbon Check latch to become active.





## RIBBON - CIRCUIT



# FORMS PATH

## INTRODUCTION

Continuous forms are passed from the load compartment **A**, between the hammers and the ribbon, past the tractors and are stacked in a stacker compartment **H** at the rear of the printer.

The following functional areas of the forms path are briefly described in the following paragraphs:

- Forms Load Compartment **A**
- Forms Entry Guides **B**
- End-of-Forms Switch **C**
- Tension Fingers **D**
- Paper Clamp **E**
- Forms Tractors **F**
- Tinsel **G**
- Stacker Compartment **H**

For more detail of the print area and tractors, see "Carriage", (15-270). For removal and replacement of parts, see "Forms Path," Section 7, 7-000.

## FORMS LOAD COMPARTMENT **A**

The forms load compartment holds a stack of forms up to 320 mm (12.5 inches) high.

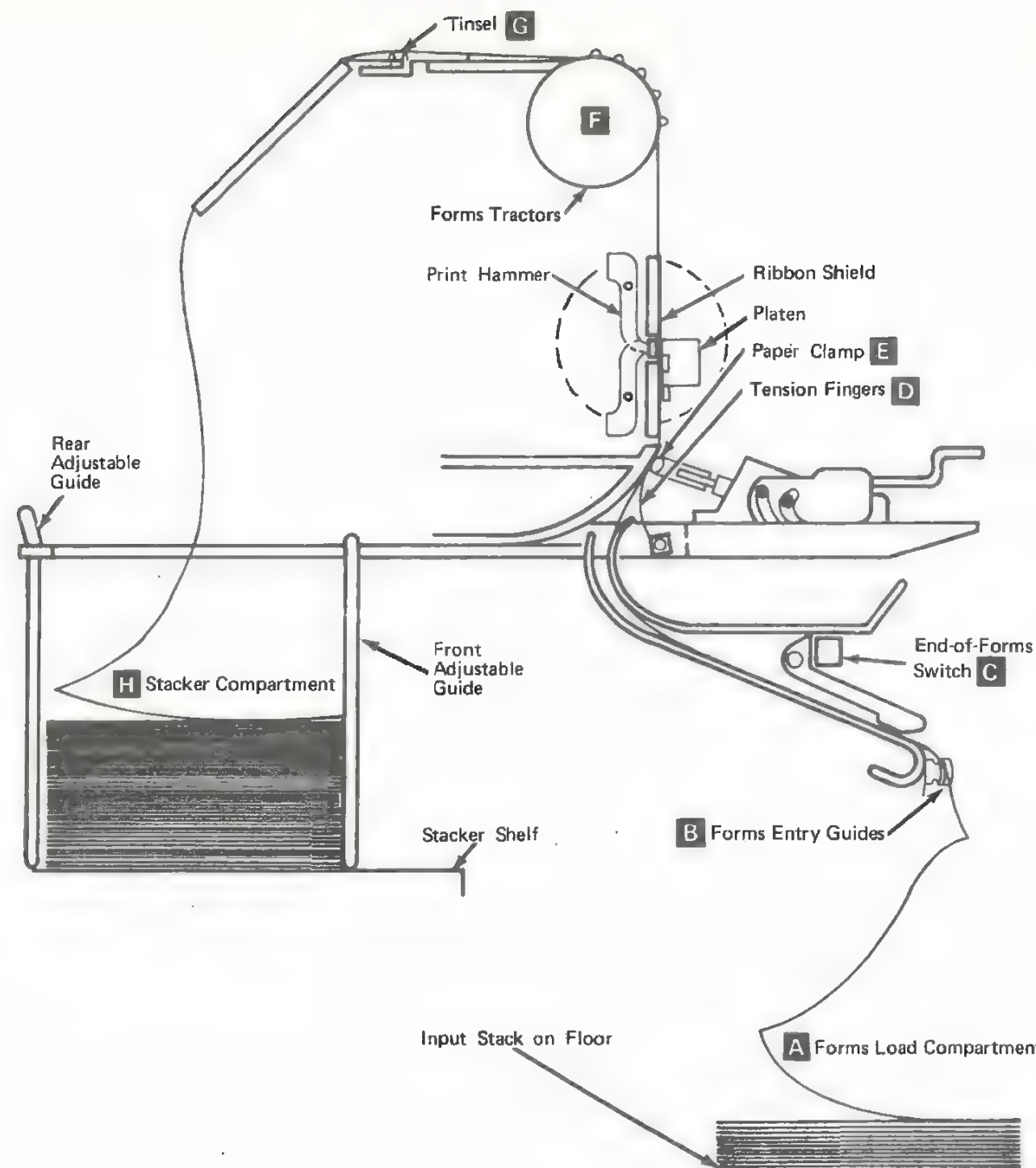
## FORMS ENTRY GUIDES **B**

There are two forms chute guides at the top of the forms load compartment that are used to align the forms as they enter the forms path.

## END-OF-FORMS SWITCH **C**

The End-of-Forms switch senses the absence of forms in the forms chute. It closes when approximately 318 mm (12.5 inches) of forms remain below the print line and a signal is sent to the system. This signal turns on the Forms light in the printer and indicates to the system to finish the command in process, stop the carriage, and turn off the Ready light. This signal remains active as long as there is less than the above amount of paper in the forms path.

If the command in process contains an operation with a carriage skip of four or more lines, the carriage must be stopped within 4 lines to allow operator access to the last form within the forms chute. The operator has the option of completing the remaining forms by depressing the Ready key causing the printer to print and advance until the next line 1 occurs. At this time, it becomes Not Ready (the Ready light turns off).



## TENSION FINGERS **D**

These 6 fingers are located in the forms path before the paper clamp. The fingers ride against the forms and provide a drag to keep the forms under tension through the paper clamp and print unit areas.

The tension on each finger is adjustable by turning a threaded shaft into a clevis. See "Forms Path", Section 7, 7-000.

## PAPER CLAMP **E**

The paper clamp is a solenoid-operated device used to hold the forms so no lateral motion occurs while a line is being printed. This clamp is moved against the paper by a solenoid that is controlled by the 'Activate Paper Clamp' signal from the printer. This clamp signal must be deactivated 6.1 to 7.2 milliseconds before activating 'Carriage Go'. It must be activated within 10 microseconds of the end of 'Carriage Go' or not later than 10 milliseconds before initiation of printing when no carriage motion takes place.

## FORMS TRACTORS **F**

The two pin-feed tractors, mounted on a motor/belt-driven shaft, move the forms through the printer. For more detail, see "Carriage Drive, Tractors" (15-270).

## TINSEL **G**

There is a piece of tinsel strung across the forms path to touch the forms as they pass through the printer. This tinsel removes the static charge on the forms after printing.

## STACKER COMPARTMENT **H**

The stacker compartment, at the rear of the printer, holds the forms after printing. The adjustable front and rear stacker guides may be moved forward and backward to allow forms of various lengths to stack properly. The rear guide pivots so forms can be removed.



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CARRIAGE

INTRODUCTION

The IBM 5211 Printer has a tapeless carriage consisting of the following functional units: carriage stepper motor, carriage feedback emitter assembly, tractors, and control logic. The carriage moves continuous forms through the printer. Spacing and skipping of the forms is controlled by the system. Skipping may be done up to 508 mm (20 in.) per second.

*Note:* For removal and adjustment procedure, see "Carriage," Section 8, 8-000.

A signal from the system initiates the movement of forms by gating the first carriage advance pulse from the control circuit. This motor control logic continues to provide pulses to the drive motor until the forms have advanced the proper distance as specified by the system via a 'Carriage Go' signal. At this time, the last three drive pulses are delayed to slow the forms down before being stopped. A small detent current holds the carriage motor in the stopped position.

There are three carriage error conditions sensed by the using system. When any of these conditions occur, the system turns on the Check light and the Forms light on the printer, and turns off the Ready light. The error conditions are as follows:

- *Carriage Check 1* — This check occurs if there are missing or extra carriage advance pulses during a carriage operation.
- *Carriage Check 2 — (Single Space)* This check occurs if the timing between the deactivation of the paper clamp pulse and the deactivation of the paper settling pulse within the system exceeds 34 ms, three or more times during the printing of one page (line 1 to line 1).
- *Forms Jam Check* — The system indicates a forms jam if the signal 'Forms Pulse' is not sensed within the distance of 4 to 6 holes (2 to 3 inches) of forms movement.

CARRIAGE DRIVE

Tractors

Two pin-feed tractors **A** move forms through the printer. Each tractor has a cover that holds the forms onto the tractor pins. Hand operated levers **B**, located at the bottom of each tractor, are used to horizontally position the tractors to accommodate various form widths. The left tractor houses a forms motion sensing assembly. When no holes are sensed within approximately 40 to 90 mm (1-1/2 to 3-1/2 in.) of carriage motion, the system detects that forms are not moving properly and the not-ready condition is set.

The forms advance knob **C** is attached to the left end of the tractor shaft. Turning this knob provides coarse vertical adjustment of the forms. For fine vertical adjustment, press the knob in (toward the right) and turn. This adjustment should be made only when the printer is not printing.

Carriage Motor

The tractors are driven by the carriage motor via a drive belt. This stepper motor is driven by 'Carriage Advance Pulses' developed by the control logic in the printer.

Feedback Circuit

There is a feedback timing disk **D** mounted on the end of the motor shaft. Slots on this disk, along with a light emitting diode (LED)/phototransistor circuit, provide 'Carriage Feedback' pulses when the disk is turned. These pulses are used to develop the second and following 'Carriage Advance Pulses' that drive the carriage.

Carriage Detent

This is accomplished electrically by having a small current flow through a resistor network and two of the carriage motor coils because there are always two of the carriage stepper motor drive lines active. Therefore, current flows through the two coils and limiting resistors to +25V. When the carriage advances, the resistance is effectively reduced by the 'Pad Drive' lines before drive pulses are applied to the carriage motor.

SYSTEM CONTROL

The system program controls all printing and forms movement. 'Carriage Go' is provided by the system and is used to set the circuits to generate the 'Carriage Advance Pulses' which are used to drive the carriage motor.

Forms Spacing

Forms spacing of either 6 or 8 lines per inch is possible by setting the 6LPI/8LPI switch on the operator's panel or by program control. It takes 48 advance pulses to move the forms one inch; therefore, if set on 6 lines per inch, 8 pulses are needed to move the form one line space. If set on 8 lines per inch, six pulses are needed for one line space.

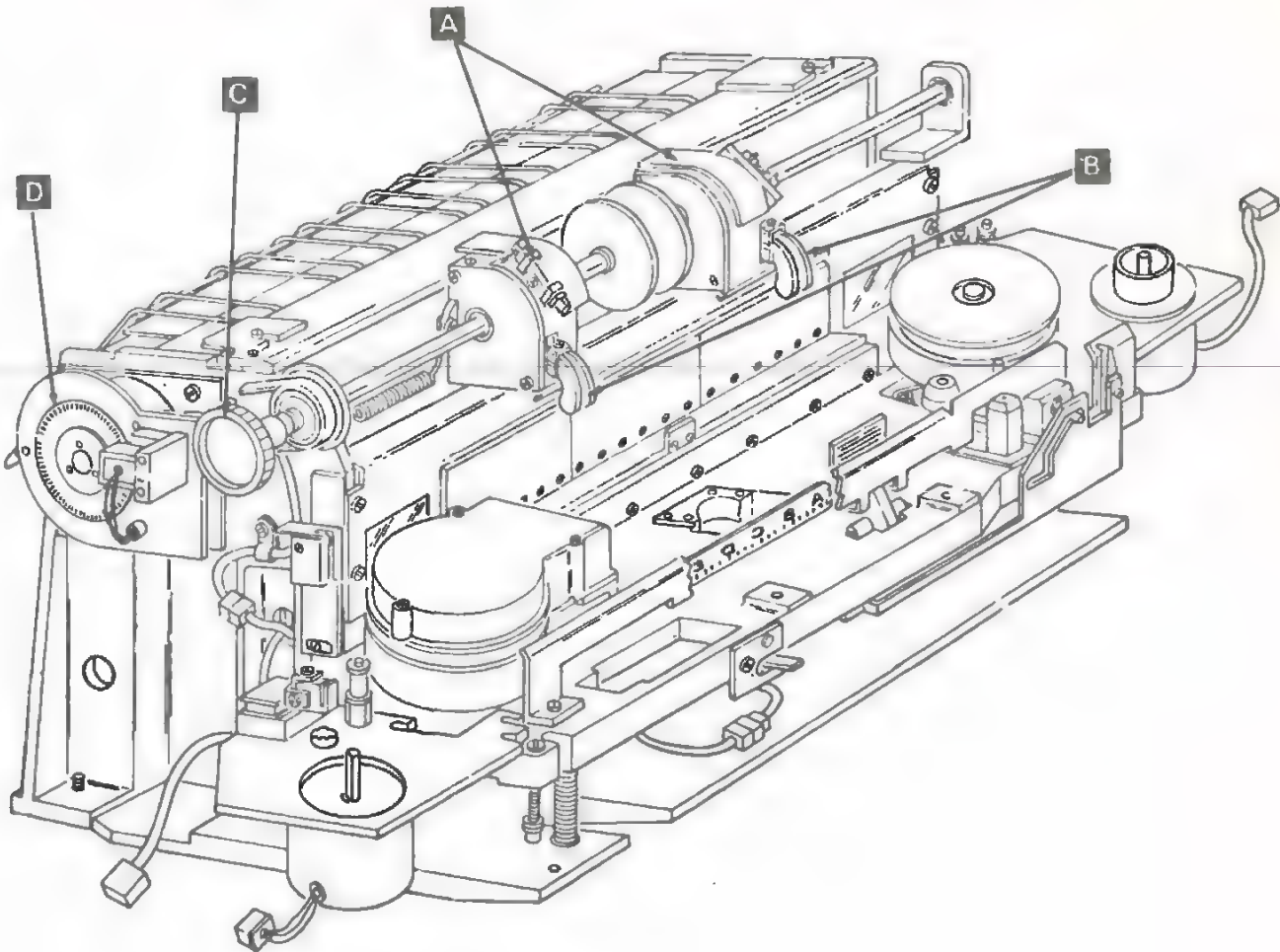
The last three advance pulses of the last line to advance are provided by the 5211. These pulses, called stop pulses, slow the carriage motor down because they are delayed from the normal drive pulses.

Forms Skipping

Forms skipping is just a continuation of spacing and may be done up to 508 mm (20 in.) per second. The system always directs the printer (via the 'Carriage Go' signal) to stop skipping one line short of the required amount. The additional line is advanced as a one-line space.

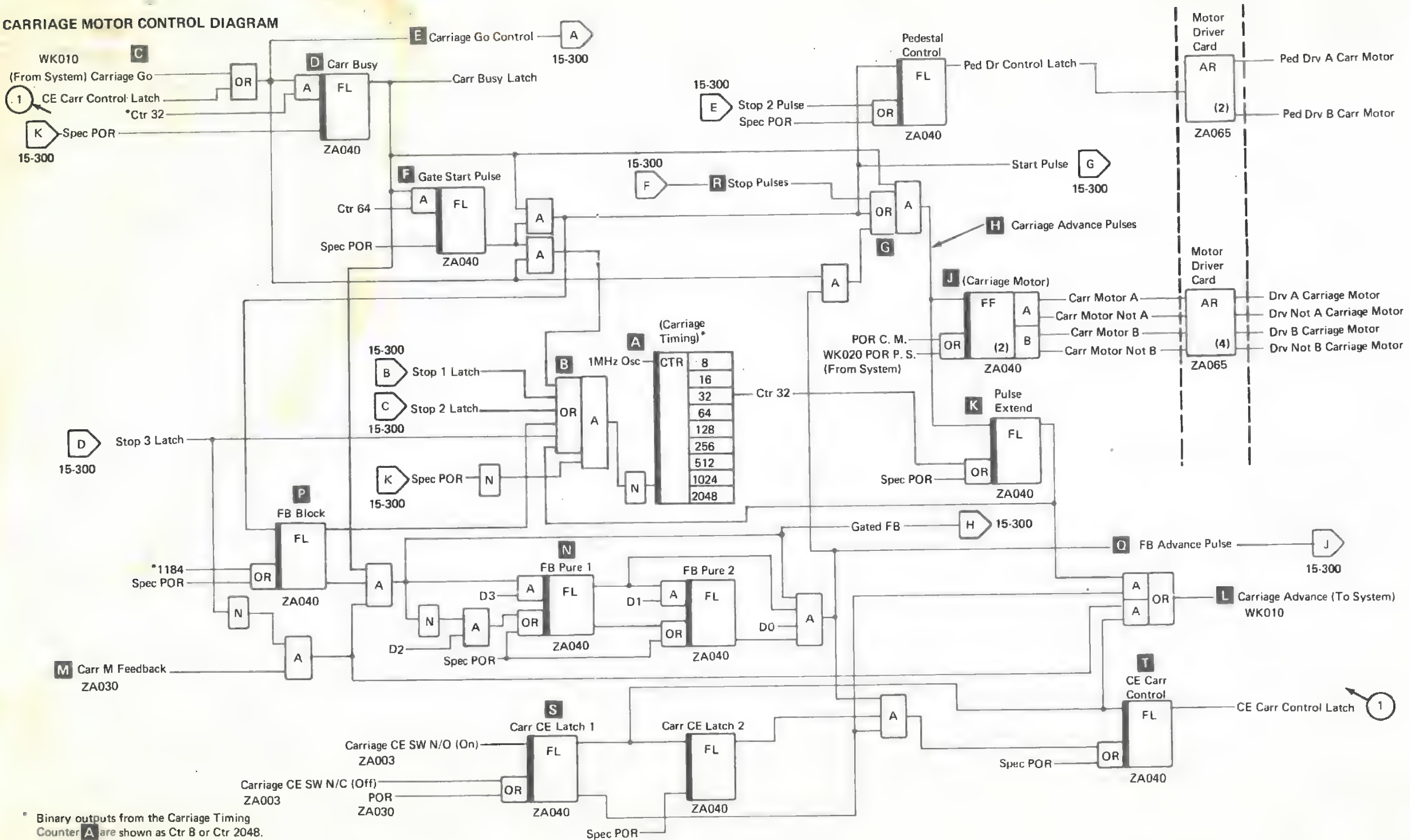
Forms Control Buffer (FCB)

The forms control buffer in the system is loaded with the number of lines that are on the forms to be used. The line count is updated by the 'Carriage Advance' as the carriage moves the forms. This buffer takes the place of a carriage tape.





CARRIAGE MOTOR CONTROL DIAGRAM



\* Binary outputs from the Carriage Timing Counter A are shown as Ctr 8 or Ctr 2048. Combinations are shown without the Ctr prefix. Example: 704 - Ctr 512 + Ctr 128  
^ Ctr 64.

CARRIAGE MOTOR CONTROL

Circuit Timing

The timing for this circuit depends upon the Carriage Timing counter **A**. This binary counter circuit is unique in that any input to the OR **B** will allow the counter to run. When no signals are present, the counter is reset. Any time 'Spec POR' is active, signals are not gated to the counter and the counter is reset.

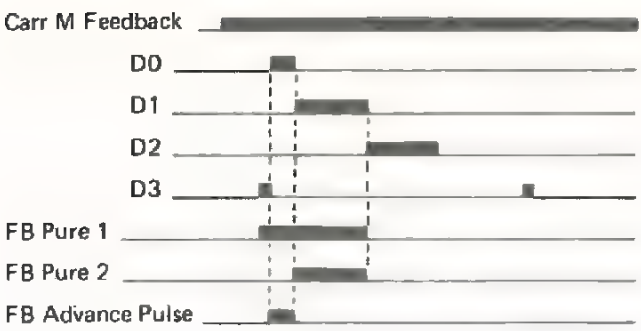
Initial Carriage Advance Pulse

'Carriage Go' **C** from the system activates the Carriage Busy latch **D** after a delay of 32 microseconds. The counter **A** was started when 'Carriage Go Control' **E** was ANDed with the not output from the 'Gate Start Pulse Latch' **F**. 'Carriage Busy Latch' and not 'Gate Start Pulse Latch' are ANDed and fed through an OR **G** to develop a signal 'Carriage Advance Pulses' **H**. This signal drives the Carriage Motor flip flops **J** that pulse the carriage motor. See timing chart of motor phase sequence below. The signal on the 'Carriage Advance Pulses' line **H** also activates the Pulse Extend latch **K** that produces a 32-microsecond 'Carriage Advance' pulse **L** so the system can keep track of the carriage motor advance pulses.

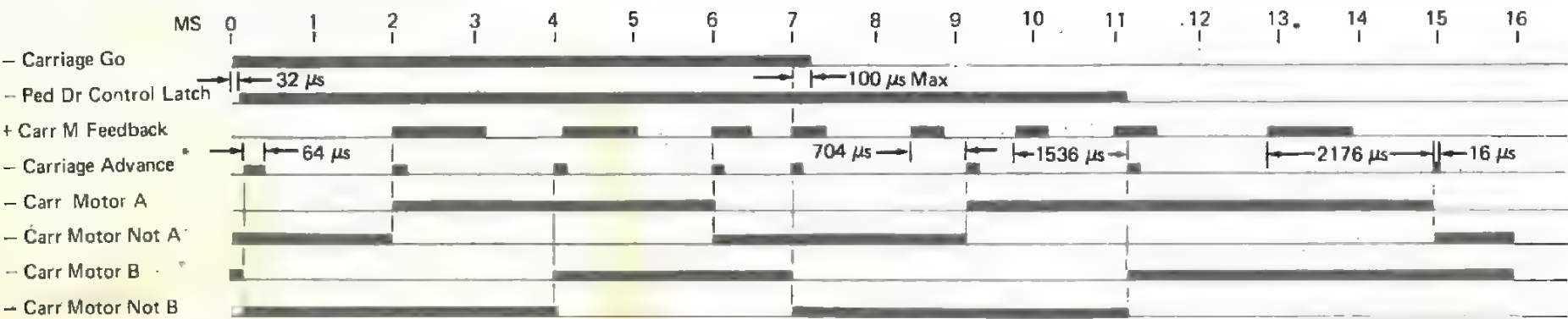
Further 'Carriage Advance' Pulses

When the motor turns, the feedback timing disk moves and a 'Carr M Feedback' pulse **M** is generated by an LED/ phototransistor circuit and used to initiate the next carriage motor advance pulse. 'Carr M Feedback' is gated to the input circuit of the FB Pure 1 latch **N** because 'Carriage Busy' **D** is still active and the FB Block latch **P** turned off at 1184 time. At 'D3' time FB Pure 1 latch is activated conditioning FB Pure 2 latch to turn on at 'D1' time. Before that happens, 'D0' gates 'FB Pure 1', not 'FB Pure 2', and 'Gated FB' to develop a 'FB advance Pulse' **O**. This advance pulse ANDed with 'Carr Go Control' **E** is fed to the OR circuit **G**. This signal and 'Carr Busy' **D** are used to generate the second pulse on the 'Carriage Advance Pulses' line **H** and the motor is stepped again. Carriage advance pulses continue to be developed in the same manner until 'Carriage Go' is deactivated.

After 'Carriage Go' becomes inactive there are three additional advance pulses developed, each with an increasing time lag so the carriage slows before it stops. This is done by having 'Carriage Busy' gating 'Stop Pulses' **R** to develop the 'Carriage Advance Pulses'. See "Stop Pulse Development", (15-300).



MOTOR PHASE SEQUENCE TIMING CHART



\* The time of the first and last Carriage Advance pulses are indicated, all others are 32  $\mu$ s.

Note: All Carr Motor pulses may be 180° from as shown.



Stop Pulse Development

These stop signals are developed as follows: After 'Carriage Go' becomes inactive, it causes 'Carriage Go Control' to become inactive. The next 'Gated FB' pulse **A** starts the FB Stop Counter **B** which had been reset with a 'Start Pulse' when the first carriage advance pulse was developed. This binary counter advances with each 'Gated FB' and develops pulses used to set the three stop latches. Each time a stop latch is activated, the Carriage Timing counter (15-280) is reset. Because the counter operates at 1 MHz, 704 and 720 will be the number of microseconds after Stop 1 latch becomes active.

An FB Stop Counter decode of 2 (2 feedback pulses) and the next 'FB Advance Pulse' **C** turn on Stop 1 latch. This resets the Carriage Timing counter (15-280) so a 'Stop Pulse' **D** is developed 704 microseconds later. This is a 16-microsecond pulse because Stop 1 latch was reset at 720 time. This 'Stop Pulse' is used to develop the next carriage advance pulse. Because this advance pulse was delayed by 704 microseconds the motor slows down. See "Motor Phase Sequence Timing Chart" (15-290).

A decode of 3 turns on Stop 2 latch, resets the counter again, and gates another 16-microsecond pulse to the motor via the 'Stop Pulses' signal at 1536 time further slowing the motor. The Pedestal Control latch (15-280) is reset when 'Stop 2 Pulse' **E** is activated which deactivates the 'Ped Dr Control Latch' line removing the pedestal voltage from the drive motor. This forces the motor to slow down even more with the following advance pulse.

The next advance pulse is developed following the development of the 'Stop 3 Latch' pulse. This pulse is active after a decode of 5 (5 feedback pulses). At 2176 microseconds later, a signal is placed on the 'Stop Pulses' line and is used to make another carriage advance pulse. Because of the increased delay, the carriage motor is slowed even more.

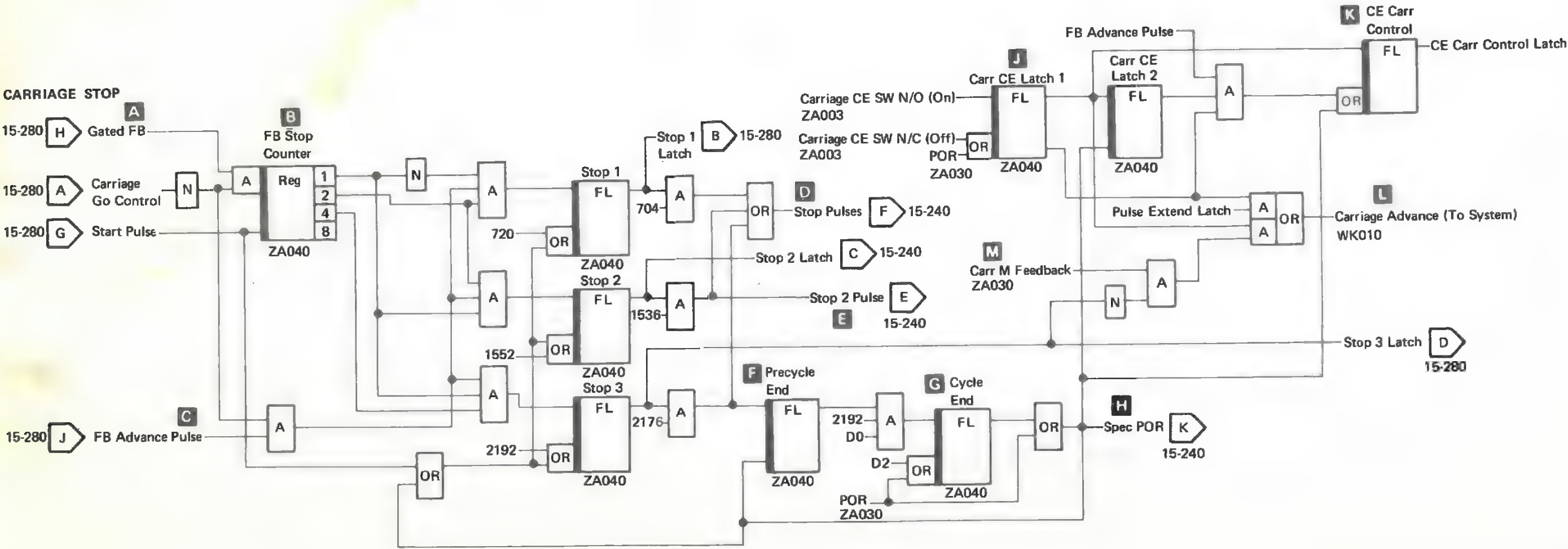
Also at this time, the Precycle End latch **F** is activated. After 16 microseconds Cycle End latch **G** is activated and 'Spec POR' line **H** is developed. 'Spec POR' resets the complete circuit and prevents any more drive pulses from being sent to the carriage drive motor.

Carriage CE Switch Circuit

The carriage also advances when the Carriage CE switch is turned on activating Carr CE Latch 1 **J**. The output from this latch activates the CE Carr Control latch **K**. Its output, 'CE Carr Control Latch' signal, takes the place of 'Carriage Go' from the system and activates the Carr Busy latch.

The circuit then functions the same as if 'Carriage Go' were present except for the development of the 'Carriage Advance' pulses **L** sent to the system. In this case, these pulses are developed by the output from the Carr CE Latch 1 **J** ANDed with a signal which is 'Carr M Feedback' **M** ANDed with not 'Stop 3 Latch'.

Turning Carriage CE switch off slows the carriage and stops it as was explained in "Stop Pulse Development".



PRINT AND SPACE OPERATION

MODEL-1

This page describes the functions and the timing relationships for printing and carriage movement for the IBM 5211 Model-1 Printer. The example is based on using a 48-character set print belt and 6 lines-per-inch forms spacing.

The print and space cycle takes approximately 375 milliseconds for Model-1 with the printing portion and spacing portion taking approximately 345 and 30 milliseconds, respectively.

System Setup

The following conditions are active before starting to print:

- The belt image is loaded in the UCSB (Universal Character Set Buffer) in the system.
- The forms image is loaded in the FCB (Forms Control Buffer) in the system.
- The system is synchronized with the printer with the "home" pulse that was developed from the home position on the print belt.
- The system has Model-1 status loaded.

When the system has data to print, the user's program issues a print command, which loads a block of data in the PLB. The block includes data to be printed as well as additional commands used by the printer attachment to perform printer-related tasks such as setting the left-most print position and forms spacing/skipping controls.

The system activates the paper clamp to prevent forms movement during printing.

Printing Odd-Numbered Print Positions

The printer and system execute 240-odd print subscans (5 for each character in the character set) to address the hammers. The system activates 240 fire-tier pulses to fire the hammers to print the characters in the odd-numbered print positions.

The print subscans provide the timing relationship between the print belt and the system. Each print scan has 5 print subscans that follow in sequence: 1-2-3-4-5, then repeat. The print subscan pulses are sent from the printer to the system. The system develops fire-tier pulses that also follow in sequence: 1-2-3-4-5, then repeat. Each fire tier is assigned to fire certain hammers. For example, Fire Tier 1 always fires hammers for print positions 1, 11, 21, etc. during the 48-odd print scans.

During subscan 1, the system compares the characters in the PLB that are to be printed in print positions 1, 11, 21, etc. with the characters in the UCSB that represent the characters on the belt that are physically aligned with print positions 1, 11, 21, etc. If these two characters are equal, the system sends the correct data bits to the printer to address the hammer. The printer performs a parity check on the address. The system sends a strobe pulse for each valid hammer address, and sets the correct hammer latch.

After the latches are set, Fire Tier 1 is activated by the system. Fire Tier 1 is timed to fire the hammers that are aligned with print positions 1, 11, 21, etc. Fire Tier 1 ANDs with the hammer latches that are turned on to activate the hammer driver(s), firing the hammers.

During each fire tier time, the system activates hammer sample pulses that perform hammer echo checking. Any hammer that

is fired responds to its hammer sample pulse by activating the 'Hammer Echo Return' signal to the system. For example, if 3 hammers are fired, the hammer echo return signal is activated 3 times.

These procedures are repeated for each of the 240-odd subscans:

- Subscan and Fire Tier pulse generation
- Comparing data with print belt to address the hammers
- Firing the hammer(s) and echo checking

Note that portions of the addressing and firing overlap. For example, when Fire Tier 1 is active and firing hammers 1, 11, 21, print subscan 2 is active and addressing hammer latches 3, 13, 23. These latches are fired by the Fire Tier 2 pulse.

After subscan 5 of print scan 48 is completed, the system waits for 15 print subscans before starting the 48-even print scans. This allows time for hammer settling between printing the odd-numbered print positions and printing the even-numbered print positions.

Printing Even-Numbered Print Positions

The printer and system execute 240-even print subscans to address the hammers. The system activates 240 fire tier pulses to fire the hammers to print the characters in the even-numbered print positions.

The subscan and fire tier pulses follow in the same order as the odd print scans. The same functions are executed: comparing data for hammer addressing, firing, and echo checking.

After the 48-even print scans, the print portion of the operation is done.

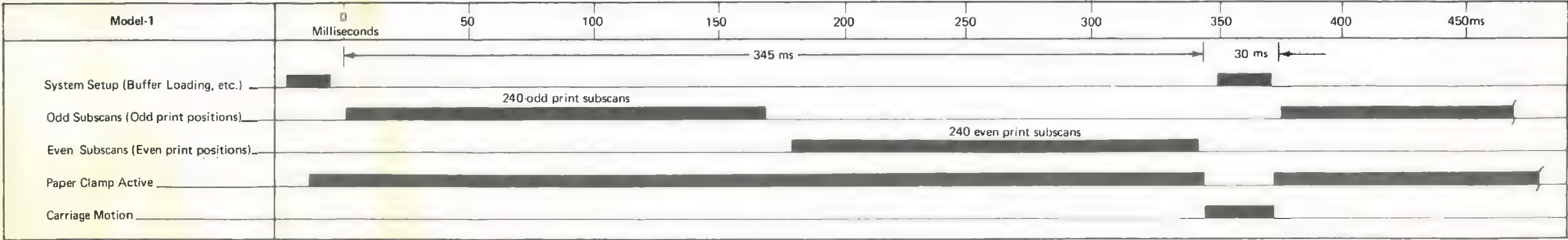
Forms Movement

When the 48th print scan is completed, the system deactivates the paper clamp to allow forms movement. At this time, the system activates 'Carriage Go' to the printer which develops 8 carriage advance pulses. These pulses are used to drive or "step" the carriage motor and are also returned to the system to update the line count in the FCB and to verify carriage motion. The carriage motor moves the forms 1/6 inch.

The system activates the paper clamp to hold the forms for the next print line.

The sequence of 48-odd and 48-even print scans and forms movement is repeated for each print line.

PRINT AND SPACE TIMING MODEL-1





MODEL-2

This page describes the functions and the timing relationships for printing and carriage movement for the IBM 5211 Model-2 Printer. The example is based on using a 48-character set print belt and 6 lines-per-inch forms spacing.

The print and space cycle takes approximately 200 milliseconds for Model-2 with the printing portion and spacing portion taking approximately 170 and 30 milliseconds, respectively.

System Setup

The following conditions are active before starting to print:

- The belt image is loaded in the UCSB (Universal Character Set Buffer) in the system.
- The forms image is loaded in the FCB (Forms Control Buffer) in the system.
- The system is synchronized with the printer with the "home" pulse that was developed from the home position on the print belt.
- The system has Model-2 status loaded.

When the system has data to print, the user's program issues a print command, which loads a block of data in the PLB. The block includes data to be printed as well as additional commands used by the printer attachment to perform printer-related tasks such as setting the left-most print position and forms spacing/skipping controls.

The system activates the paper clamp to prevent forms movement during printing.

Printing

The printer and system execute 240 print subscans (5 for each character in the character set) to address the hammers. The system activates 240 fire-tier pulses to fire the hammers to print the characters.

The print subscans provide the timing relationship between the print belt and the system. Each print scan has 5 print subscans that follow in sequence: 1-2-3-4-5, then repeat. The print subscan pulses are sent from the printer to the system. The system develops fire-tier pulses that also follow in sequence: 1-2-3-4-5, then repeat. Each fire tier is assigned to fire certain hammers. For example, Fire Tier 1 always fires hammers for print positions 1, 6, 11, 16, etc.

During subscan 1, the system compares the characters in the PLB that are to be printed in print positions 1, 6, 11, 16, etc. with the characters in the UCSB that represent the characters on the belt that are physically aligned with print positions 1, 6, 11, 16, etc. If these two characters are equal, the system sends the correct data bits to the printer to address the hammer. The printer performs a parity check on the address. The system sends a strobe pulse for each valid hammer address, and sets the correct hammer latch.

After the latches are set, Fire Tier 1 is activated by the system. Fire Tier 1 is timed to fire the hammers that are aligned with print positions 1, 6, 11, 16, etc. Fire Tier 1 ANDs with the hammer latches that are turned on to activate the hammer driver(s), firing the hammer(s).

During each fire-tier time, the system activates hammer sample pulses that perform hammer echo checking. Any hammer that is fired responds to its hammer sample pulse by activating the 'Hammer Echo Return' signal to the system. For example, if 3 hammers are fired, the hammer echo return signal is activated 3 times.

These procedures are repeated for each of the 240 subscans:

- Subscan and Fire-Tier pulse generation
- Comparing data with print belt to address the hammers
- Firing the hammer(s) and echo checking.

Note that portions of the addressing and firing overlap. For example, when Fire Tier 1 is active and firing hammers 1, 6, 11, 16, etc. print subscan 2 is active and addressing hammer latches 3, 8, 13, 18, etc. These latches are fired by the Fire Tier 2 pulse.

After the 48-even print scans, the print portion of the operation is done.

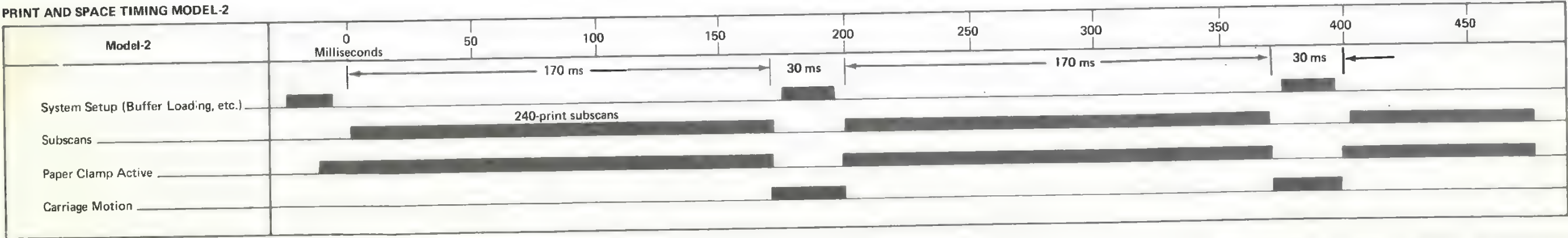
Forms Movement

When the 48th print scan is completed, the system deactivates the paper clamp to allow forms movement. At this time, the system activates 'Carriage Go' to the printer which develops 8 carriage advance pulses. These pulses are used to drive or "step" the carriage motor and are also returned to the system to update the line count in the FCB and to verify carriage motion. The carriage motor moves the forms 1/6 inch.

The system activates the paper clamp to hold the forms for the next print line.

The sequence of 48-print scans and forms movement is repeated for each print line.

PRINT AND SPACE TIMING MODEL-2



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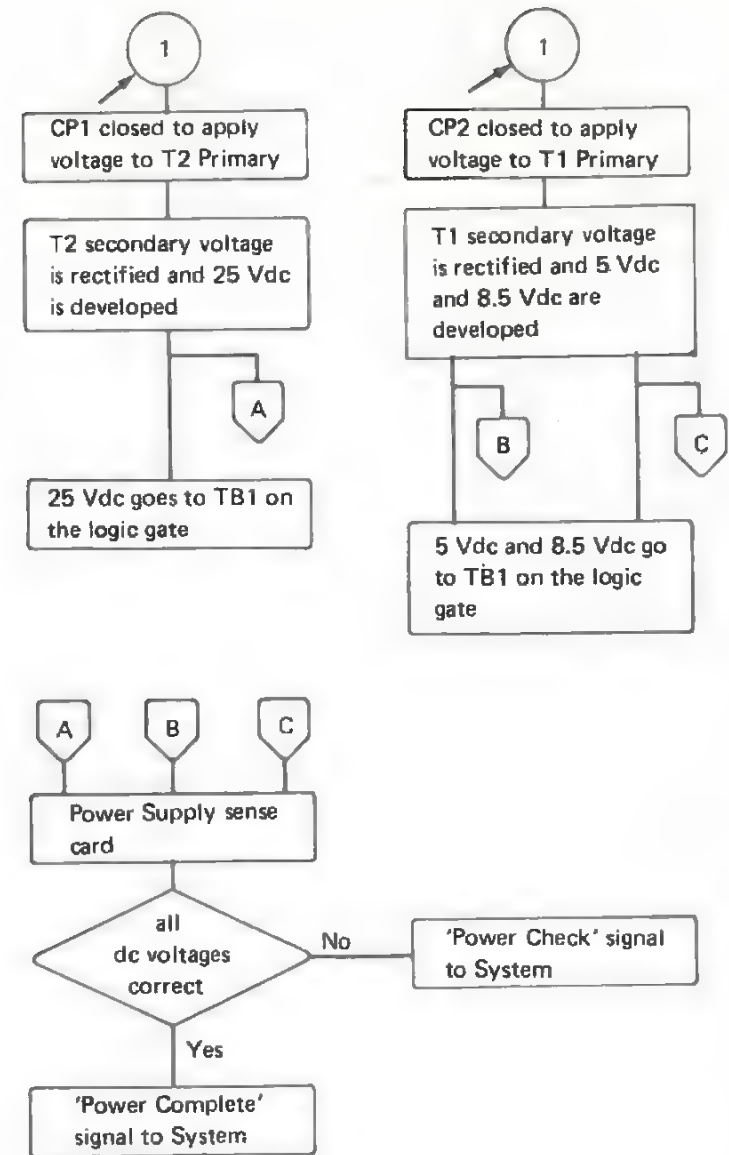
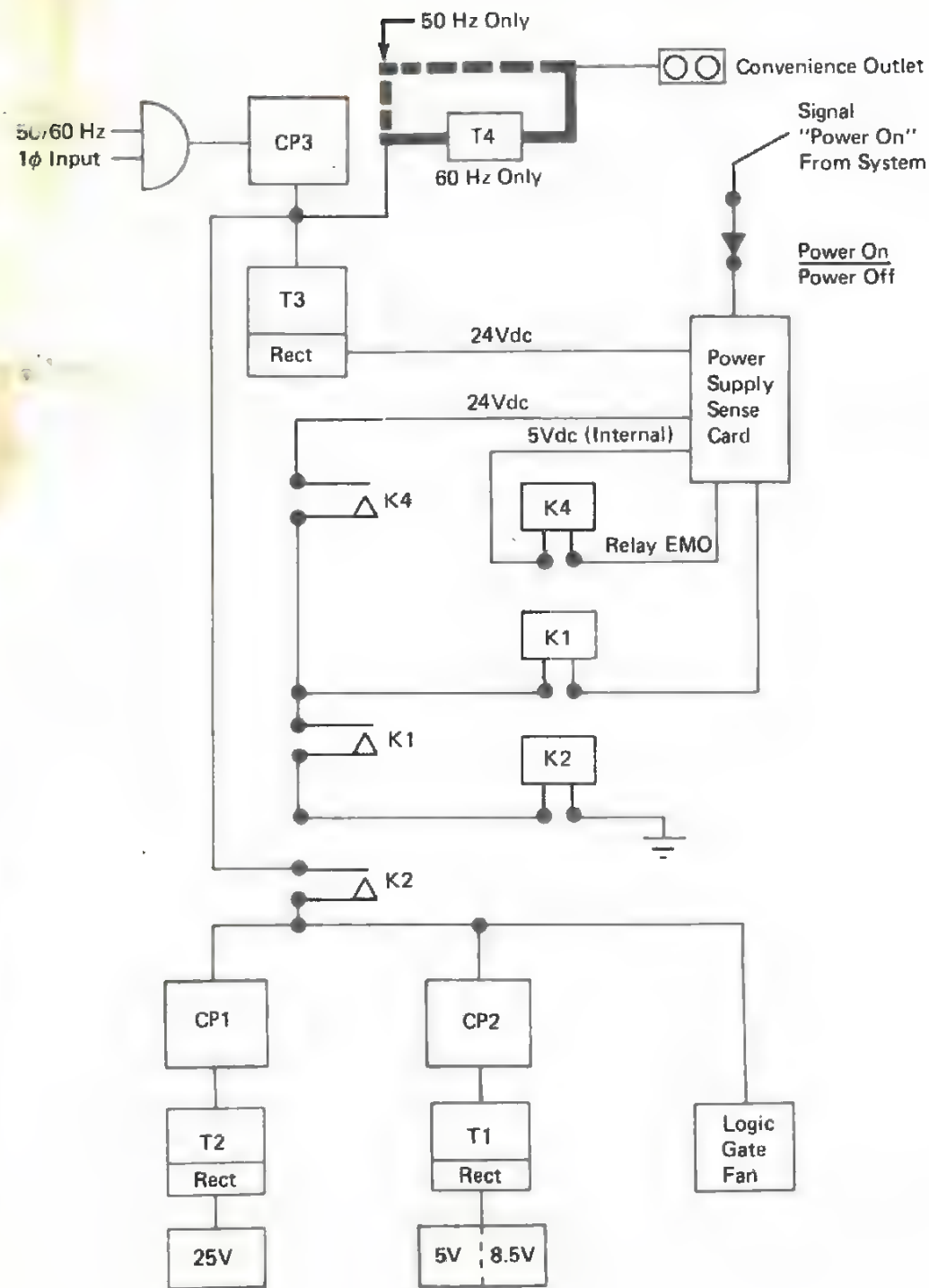
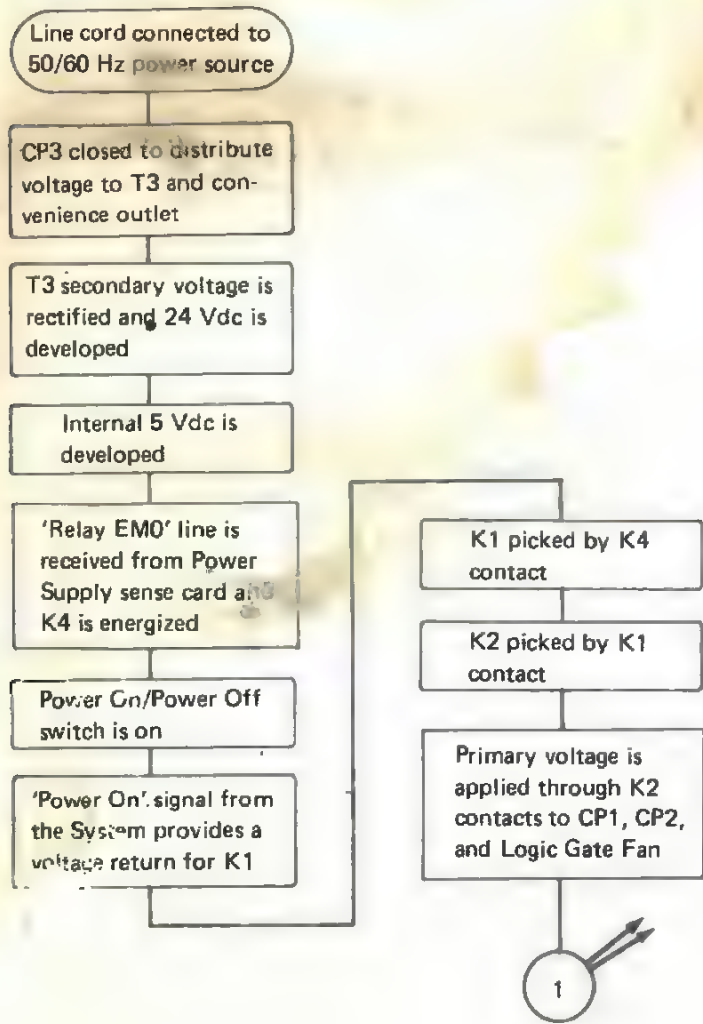


POWER SUPPLY – LEVEL 2

INTRODUCTION

The 5211 Power Supply develops the 25 Vdc, 8.5 Vdc, and the 5 Vdc for the printer circuits and control logic. The 'Power On' signal from the System activates the 5211 power supply when the Power On/Power Off switch is turned on. When all three dc voltages are correct, a 'Power Complete' signal is sent to the System. If any voltage fails, a 'Power Check' signal is sent to the System. For detail on removal and replacement of the Power Supply, see Section 9, 9-000.

POWER ON SEQUENCE

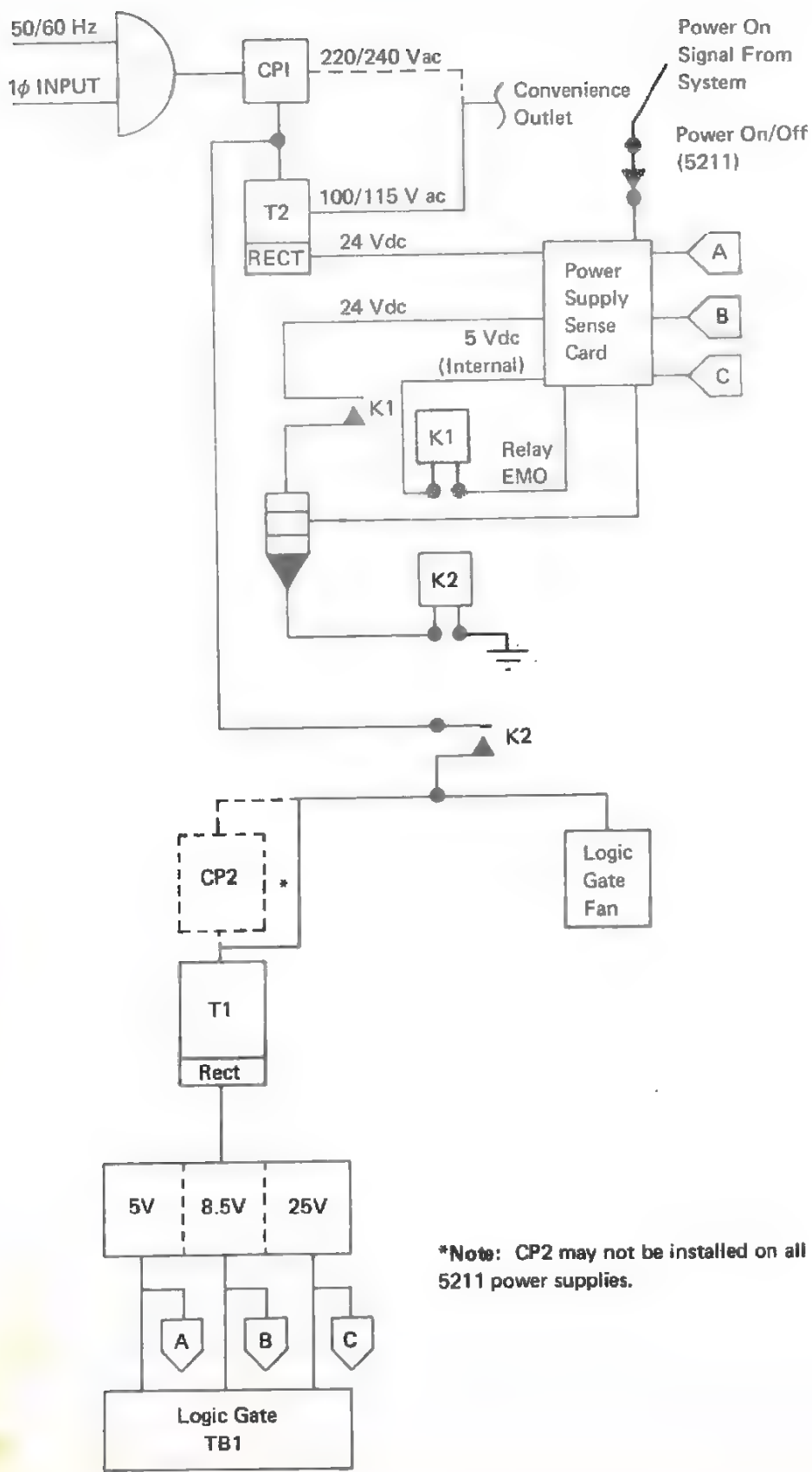


POWER SUPPLY — LEVEL 3

INTRODUCTION

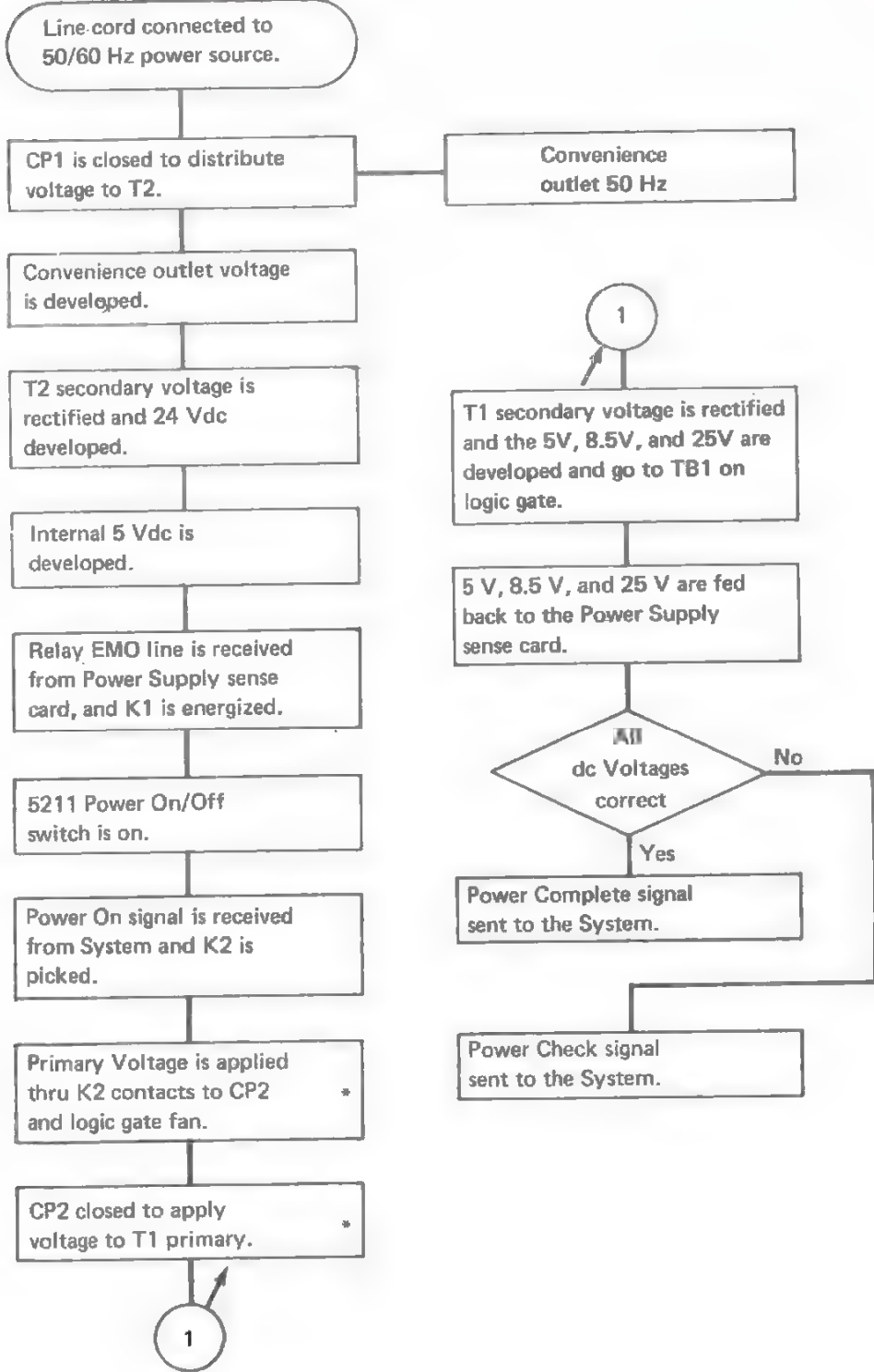
The 5211 Power Supply develops the 5 Vdc, 8.5 Vdc, and the 25 Vdc for the printer circuits and logic control. The Power On signal from the System activates the 5211 power supply when the Power On/Off switch is turned on. When all three dc voltages are correct, a Power Complete signal is sent to the System. If any dc voltage fails, a power Check signal is sent to the System and the power supply is turned off. For detailed instructions on removal and replacement of the Power Supply, see Section 9, 9-000. Refer to Section 18 (YF001) for power supply circuitry.

Note: power supply Power On Reset (POR) is active during power up.



\*Note: CP2 may not be installed on all 5211 power supplies.

POWER ON SEQUENCE





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# SECTION 16: DIAGNOSTIC DESCRIPTIONS

## INTRODUCTION

The IBM 5211 Printer is tested by seven (7) basic Function and Timing diagnostic tests:

Function Tests

- Matrix Print
- Ripple Print
- Character Print
- Carriage Space/Skip

Timing Tests

- Impression Control Single Shot (IMPSS)
- Belt Motor Feedback LED
- Carriage Motor Feedback LED

All diagnostic programs are invoked and run at the system level. The using system may have more than the basic seven diagnostic tests (Example: System/34 "Blink Console Lights"—5211 Operator Panel Lamp Test). For any additional diagnostic test descriptions and operating procedures, refer to the System Maintenance library.

This section of the Maintenance Information Manual (MIM) contains descriptive information, ONLY. Sample printouts are provided as required. NO OPERATING PROCEDURES are included. For detailed operating procedures see the using system Maintenance Documentation.

## FUNCTION TESTS

### MATRIX PRINT

This diagnostic program addresses and prints one character per print position, per line, starting in print position 1 and ending in print position 132. A sample printout of this diagnostic test can be found on 16-020. This test is commonly used by the CE to isolate hammer addressing problems. This diagnostic ends automatically after printing 132 lines.

### RIPPLE PRINT

A pattern consisting of every character in the System's UCSB (belt image) is printed in all 132 print positions. CE intervention is required to end this diagnostic test. The Ripple Print program is used to check overall 5211 print quality, printer operation, and normal single-space forms movement. See 16-030 for a sample printout of this test.

### CHARACTER PRINT

This diagnostic function test allows the CE to select a single character (including blanks) to be printed in any single print position or in all 132 positions. An example of the "Character Print" diagnostic test is found on 16-040. (This example uses the character "H" in all 132 positions.) Manual intervention by the CE is required to end this test. The "Character Print" test can be used to check print quality, or during adjustment of hammer-flight time and the PSS Emitter Assembly.

### CARRIAGE SPACE/SKIP

This function test checks the overall forms movement and handling capabilities of the 5211 printer. The CE can select either 6 LPI or 8 LPI operation. The sample printout of this test (see 16-050) was obtained using 8 LPI mode. The diagnostic program starts with a single space command and progresses through 2, 4, 8, 16, and 32 line space commands. This test normally ends after the 32 line space operation, but the CE has the option to loop this routine if so desired.

## TIMING TESTS

### IMPRESSION CONTROL SINGLE SHOT (IMPSS)

This Timing Test allows the CE to measure the Impression Control Single Shot (IMPSS). If the IMPSS timing is found to be outside recommended timing limits, this test can be used to adjust the IMPSS Potentiometer. Refer to Section 5, 5-000 for necessary detailed maintenance information.

### BELT MOTOR FEEDBACK LED

To check the first Belt Motor Feedback LED pulse, run this diagnostic timing test. Because CE Switch 1—BELT GO has to be ON, manual intervention by the CE is required. This test is also used to measure and adjust the Belt Motor LED assembly. For all service check and adjustment procedure information, see Section 4, 4-000.

### CARRIAGE MOTOR FEEDBACK LED

The CE uses this timing test to perform the "Carriage Motor Feedback LED" service check and adjustment procedure. CE Switch 2—CARR must be ON, and the forms should be removed from the tractors. All start and stopping of this test is performed either at the 5211 Printer or, the using system. For detailed maintenance procedures see, Section 8, 8-000.



SAMPLE-MATRIX PRINT TEST

1  
2  
3  
4  
5  
6  
7  
8  
9  
0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
0

Note: This test prints 132 lines and ends automatically.

4  
5  
6  
7  
8  
9  
0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
0  
1  
2  
3  
4  
5

[illegible]



### SAMPLE-CHARACTER PRINT TEST

[illegible]

**SAMPLE—CARRIAGE SPACE/SKIP TEST**  
(8 Lines Per Inch)

## CARRIAGE SPACE/SKIP TEST AT 8 LINES PER INCH

```

---- CARRIAGE WILL SPACE/SKIP 1 LINES / 0.13 INCHES ----
---- CARRIAGE WILL SPACE/SKIP 2 LINES / 0.25 INCHES ----
---- CARRIAGE WILL SPACE/SKIP 4 LINES / 0.50 INCHES ----

```

---- CARRIAGE WILL SPACE/SKIP 8 LINES / 1.00 INCHES ----

---- CARRIAGE WILL SPACE/SKIP 16 LINES / 2.00 INCHES ----

---- CARRIAGE WILL SPACE/SKIP 32 LINES / 4.00 INCHES ----

----- LAST LINE -----



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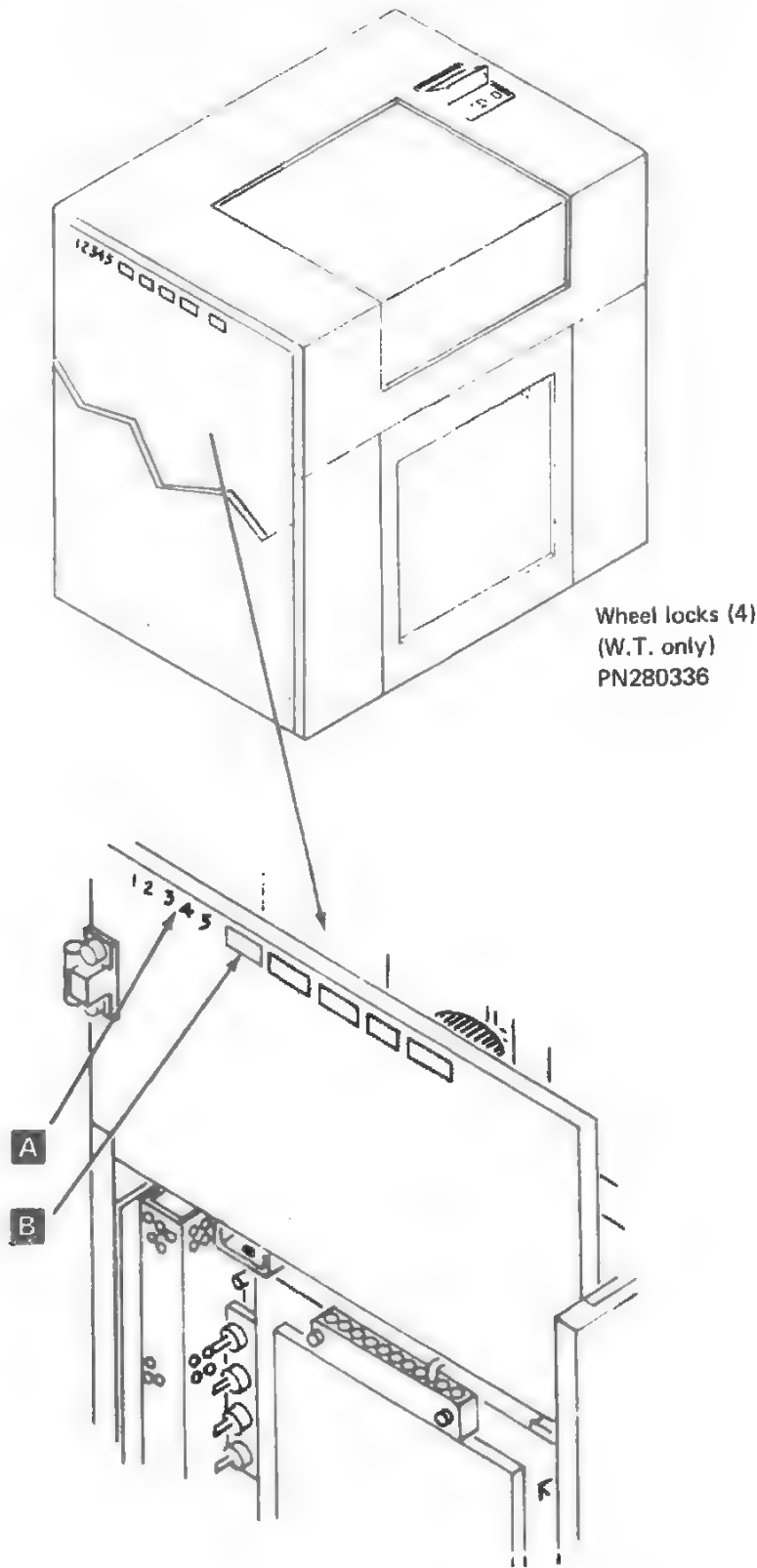
# SECTION 17: INSTALLATION INSTRUCTIONS

The following procedure should be used when installing the IBM 5211 Printer. Only one person is required and no special tools are necessary.

- Be sure to report any problems encountered using the appropriate major, minor, and cause codes on the Installation Activity Document (IAD)-US, or the Technical Action Report (TAR)-World Trade.
- Check each step as it is performed.

## PRE-INSTALLATION

1. Follow the unpacking instructions taped to the top of the printer. ☐
2. Move the printer to its installation site. (If the system is installed on a raised floor, a floor cutout for the cables should be located under each end section of the printer.) ☐
3. Open the covers and inspect for physical damage resulting from shipment. ☐
4. Verify the serial number stamped on the frame of the printer **A** and on the serial number plate **B** with the number on the machine history. ☐
5. Verify that the following items were shipped with the printer, and that the contents are complete: ☐
  - a. Shipping Group, B/M 1815101. ☐
  - b. Print Belt(s). ☐

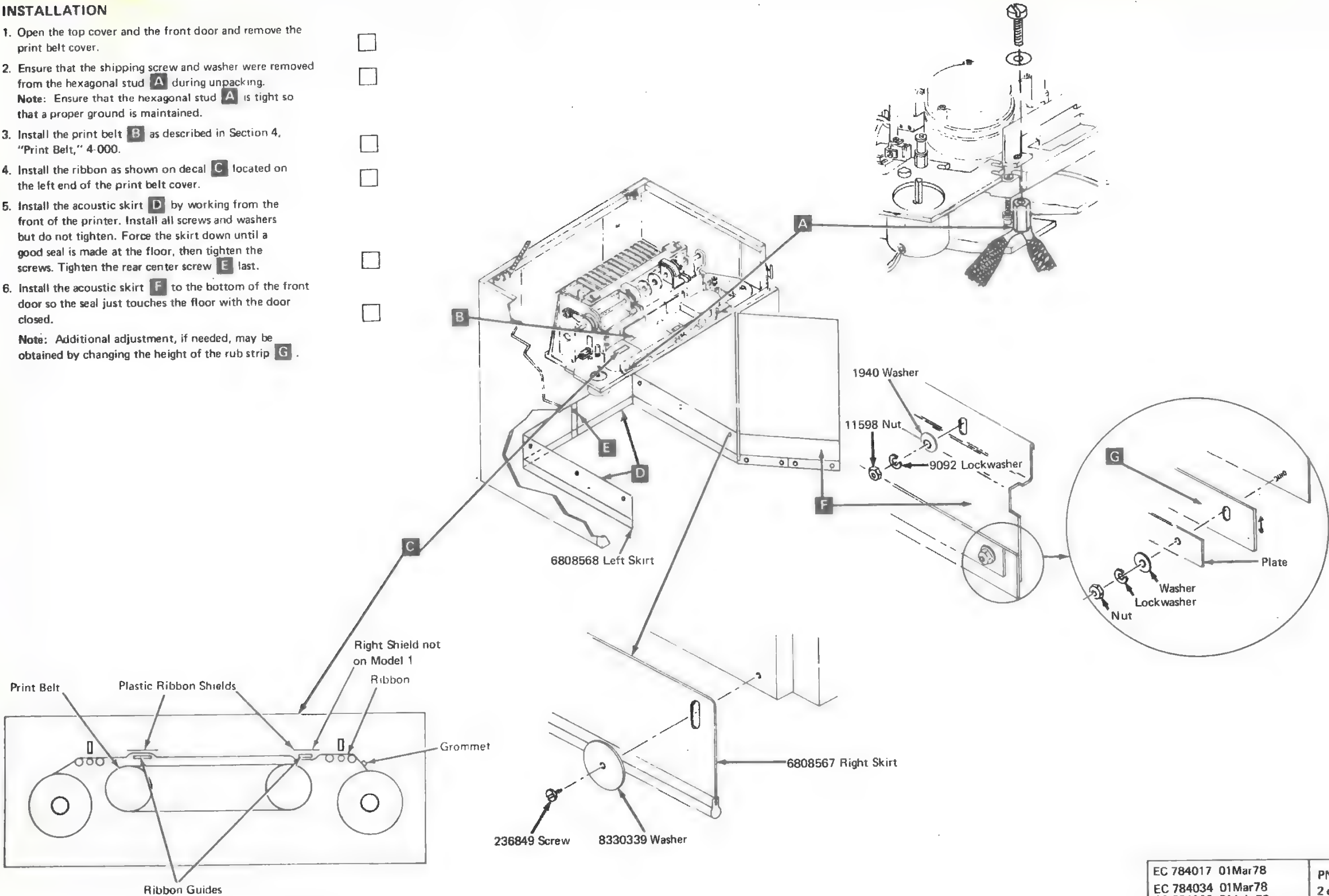




# INSTALLATION

1. Open the top cover and the front door and remove the print belt cover. ☐
2. Ensure that the shipping screw and washer were removed from the hexagonal stud **A** during unpacking. ☐  
**Note:** Ensure that the hexagonal stud **A** is tight so that a proper ground is maintained.
3. Install the print belt **B** as described in Section 4, "Print Belt," 4-000. ☐
4. Install the ribbon as shown on decal **C** located on the left end of the print belt cover. ☐
5. Install the acoustic skirt **D** by working from the front of the printer. Install all screws and washers but do not tighten. Force the skirt down until a good seal is made at the floor, then tighten the screws. Tighten the rear center screw **E** last. ☐
6. Install the acoustic skirt **F** to the bottom of the front door so the seal just touches the floor with the door closed. ☐





**Note:** Additional adjustment, if needed, may be obtained by changing the height of the rub strip **G**.

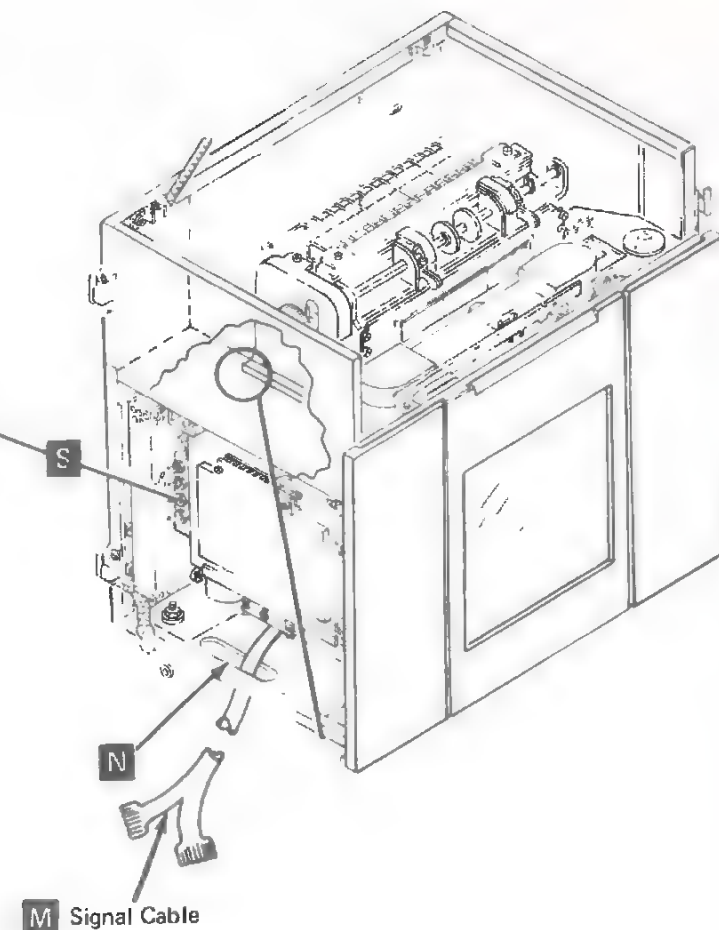


- 7



- 
- J** Line Filter (if installed)
- K**
- Note: Power cable is to tie fl*

|   |     |
|---|-----|
| CE<br>SWITCHES  |     |
|  |     |
| BELT GO<br>ON   | OFF |
|  |     |
| CARR  | OFF |
|  |     |
| RIBBON  | OFF |
|  |     |
| PAPER CLAMP   | OFF |





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SECTION 18: PRINTER WIRING DIAGRAMS — MODEL 1

SECTION CONTENTS

•This section contains the following point-to-point 5211 Printer Wiring Diagrams:

| <u>PAGE</u>                | <u>PART NUMBER</u> | <u>TITLE</u>                             | <u>PAGE</u>  | <u>PART NUMBER</u> | <u>TITLE</u>                               |
|----------------------------|--------------------|--|--|--------------------|--|
| WK010                      | 4703182            | INTF PAGE                                | ZA120  | 4703201            | Echo Check - Hammers 1 to 66               |
| WK020                      | 4703183            | INTF PAGE                                | ZZ010  | 4703229            | Component FRU Listing                      |
| YF001<br>OR<br>YF001<br>OR | 4703209            | 60 Hz Power/Level 2 Power Supply         | ZZ011  | 4703230            | Component FRU Listing                      |
| YF001<br>OR<br>YF001       | 4703210            | 50 Hz Power/Level 2 Power Supply         | ZZ012  | 6808502            | Component FRU Listing (Level 2 Power Only) |
| YF001<br>OR<br>YF001       | 8330327            | 50/60 Hz Power/Level 3 Power Supply      | ZZ020  | 4703205            | Logic Gate - TB1                           |
|                            | 8330326            | 50 Hz Power / Level 3 Power Supply       | ZZ021  | 4703206            | Gate Voltage Distribution                  |
|                            | 5593471            | Power Supply/Level 3 Power Supply        | ZZ025  | 4703207            | Card Location Chart                        |
|                            | 5593490            | Power Supply Control Board               |  |                    |  |
| ZA002                      | 4703184            | Operator Panel Lights and Switches       | Note: Logic Board Wiring-ZA010<br>5211-Model 1 — H2B12 to H2D08 (Gnd.) |                    |  |
| ZA003                      | 4703185            | CE Switches                              |  |                    |  |
| ZA010                      | 4703186            | Hammer Latch and Hammer Driver (1 to 66) |  |                    |  |
| ZA030                      | 4703189            | Amplifier Card (A1D4)                    |  |                    |  |
| ZA035                      | 4703190            | Belt Control Card (A1N2)                 |  |                    |  |
| ZA040                      | 4703191            | Ribbon and Carriage Control Card (A1P2)  |  |                    |  |
| ZA065                      | 4703192            | Motor Driver Card (A1Q2)                 |  |                    |  |
| ZA070                      | 4703193            | Carriage Motor-Right Ribbon Motor        |  |                    |  |
| ZA071                      | 4703194            | Belt Motor-Left Ribbon Motor             |  |                    |  |
| ZA080                      | 4703195            | Switches-Throat and End-of-Forms         |  |                    |  |
| ZA081                      | 4703196            | Lower Paper Clamp and Paper Hole Sense   |  |                    |  |
| ZA082                      | 4703197            | Belt and Carriage Emitter                |  |                    |  |
| ZA100                      | 4703198            | Hammer Coil Chart - Positions 1 to 66    |  |                    |  |



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|                    |            |        |
|--------------------|------------|--------|
| EC 784017 01Mar78  | PN 8324121 | 18-001 |
| EC 784034 01Mar78  | 2 of 2     |        |
| EC 784068 31July78 |            |        |

INTERFACE PAGE

4703182

WK 510

|                     |       |     |                       |
|---------------------|-------|-----|-----------------------|
| -DATA BIT 0         |       | B02 | ZAO10 -DATA BIT 0     |
| -DATA BIT 1         |       | B03 | ZAO10 -DATA BIT 1     |
| -DATA BIT 2         |       | B04 | ZAO10 -DATA BIT 2     |
| -DATA BIT 3         |       | B05 | ZAO10 -DATA BIT 3     |
| -DATA BIT 4         |       | B06 | ZAO10 -DATA BIT 4     |
| -DATA BIT 5         |       | B07 | ZAO10 -DATA BIT 5     |
| -DATA BIT 6         |       | B08 | ZAO10 -DATA BIT 6     |
| -DATA BIT 7         |       | B09 | ZAO10 -DATA BIT 7     |
| -PARITY BIT         |       | B10 | ZAO10 -PARITY BIT     |
| -STROBE             |       | D06 | ZAO10 -STROBE         |
| -HAMMER SAMPLE      |       | D07 | ZAO30 -HAMMER SAMPLE  |
| DC GROUND           |       | D08 | DC GROUND             |
| -FIRE TIER 1        |       | D09 | ZAO10 -FIRE TIER 1    |
| -FIRE TIER 2        |       | D10 | ZAO10 -FIRE TIER 2    |
| -FIRE TIER 3        |       | D11 | ZAO10 -FIRE TIER 3    |
| -FIRE TIER 4        |       | D12 | ZAO10 -FIRE TIER 4    |
| -FIRE TIER 5        |       | D13 | ZAO10 -FIRE TIER 5    |
| -CABLE INLK 1       |       | B13 |                       |
| -HAMMER ECHO RETURN | ZAO30 | B12 | -HAMMER ECHO RETURN   |
| -NOT PRINT TIME     | ZAO10 | D04 | -NOT PRINT TIME       |
| -DATA PARITY CHECK  | ZAO10 | D05 | -DATA PARITY CHECK    |
|                     |       | B11 | SPARE WIRE T.P., YEL. |
|                     |       | D03 | -CABLE INLK 2         |

| ENTER PTR             |     | AI-A5 |                       |
|-----------------------|-----|-------|-----------------------|
| -CARRIAGE GO          | DO4 | ZAO40 | -CARRIAGE GO          |
| DC GROUND             | DO8 |       |                       |
| -ACTIVATE PAPER CLAMP | DO7 | ZAO40 | -ACTIVATE PAPER CLAMP |
| *FOR                  | DO6 | ZAO30 | *FOR                  |
| -CLOSE 25V CONTACTOR  | DO9 | ZAO40 | -CLOSE 25V CONTACTOR  |
| -BELT GO              | DI2 | ZAO35 | -BELT GO              |
| -CABLE INLK 3         | BI3 |       |                       |
| AI-A5                 |     | AI-A5 |                       |
| EXIT                  |     |       |                       |
| END OF FORMS          |     |       |                       |
| -PRINT SUBSCANS       |     |       |                       |
| -THROAT CLOSED        |     |       |                       |
| -FORMS PULSE          |     |       |                       |
| -CARRIAGE ADVANCE     |     |       |                       |
| -IMPRESSION CTL SS    |     |       |                       |
| -RIBBON CHECK         |     |       |                       |
| -BELT UP TO SPEED     |     |       |                       |
| -HOME                 |     |       |                       |
| -PRINTER BUSY         |     |       |                       |
| -CE SWITCH ON         |     |       |                       |
| NOTFS                 | DO5 | AI-A5 |                       |

1. T.P. INDICATES A TWISTED PAIR WIRE. THE BLACK WIRE TIED TO DC GND.

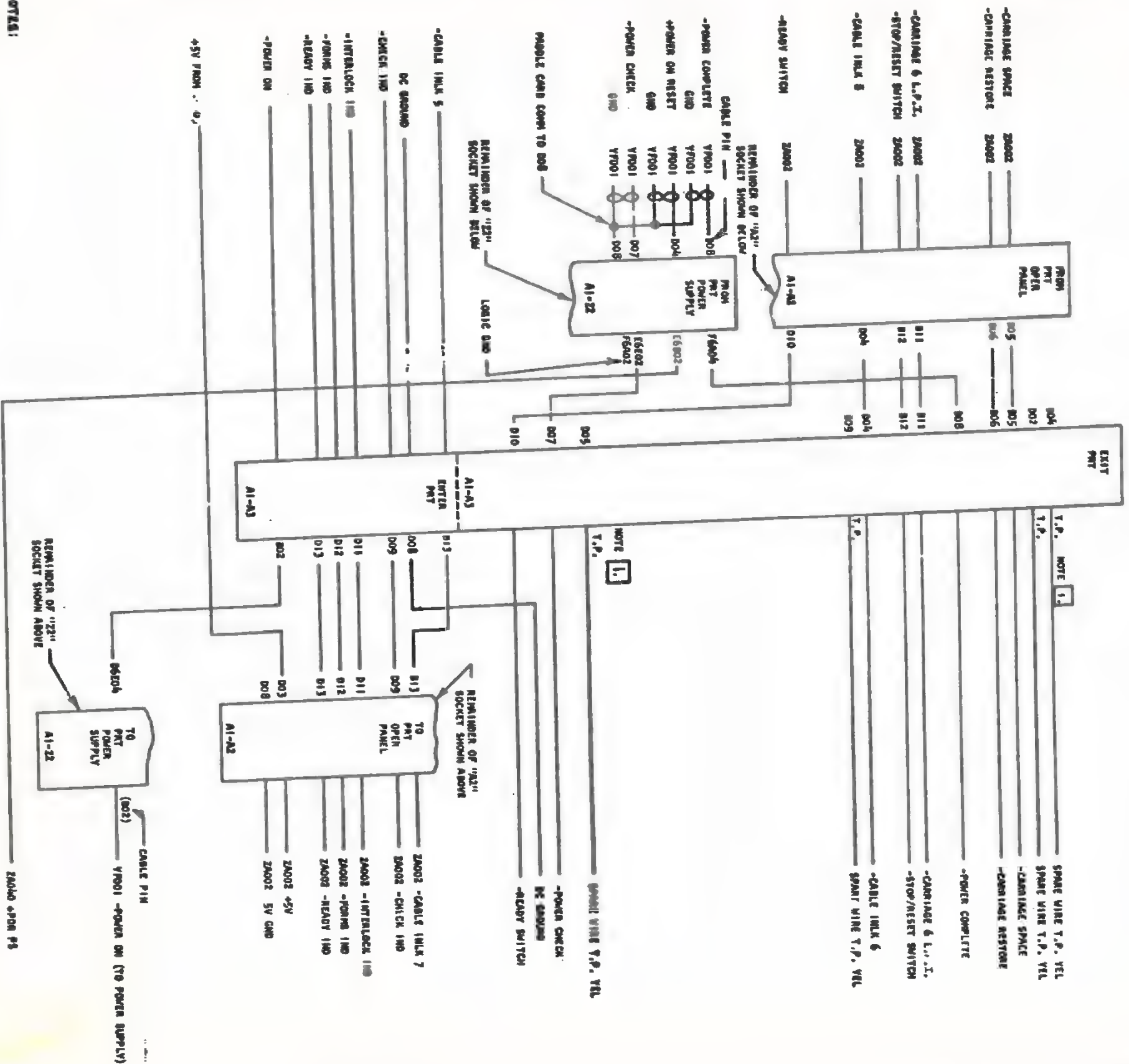
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| NAME                     |        | INTERFACE PAGE | DATE           | CHANGE NO   | DATE  | CHANGE NO |
|--------------------------|--------|----------------|----------------|-------------|-------|-----------|
| DESIGN                   |        | SHI OF         |                |             |       |           |
| DETAIL                   | L.R.I  | 4FEB77         |                |             |       |           |
| CHIEF CLK                | G.D.B. | 7FEB77         |                |             |       |           |
| ANALYST                  | R.C.H. | 9FEB77         |                |             |       |           |
|                          |        | R.C.H.         | 28FEB77        |             |       |           |
| MUST CONFORM TO ENG SPEC |        |                | DEVELOPMENT NO | LOGIC PG NO | Wk 17 |           |





## INTERFACE PAGE



**NOTES:**

**1.** T.P. INDICATES A TWISTED PAIR WIRE.  
THE BLACK WIRE TIED TO DC GND.

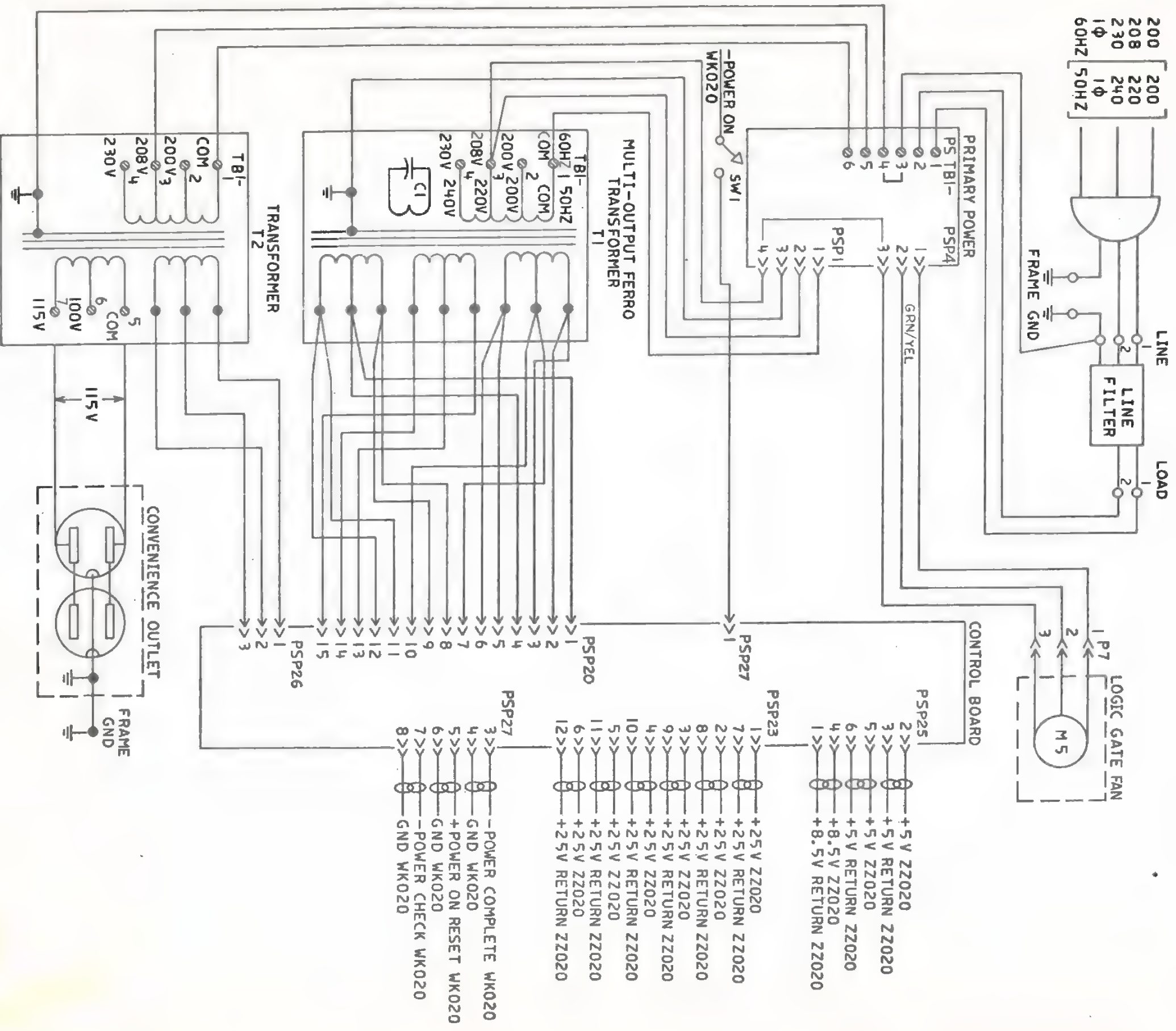
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| NAME   |  | INTERFACE PAGE |  | DATE                     |  | CHANGE NO      |  | DATE           |  | CHANGE NO |  |
|  |  |                |  | 24 JAN 77                |  | 1193290        |  |                |  |           |  |
|  |  |                |  | 10 AUG 77                |  | 3-9824         |  |                |  |           |  |
|  |  |                |  | 6 DEC 77                 |  | 356703         |  |                |  |           |  |
|  |  |                |  | 18 APR 78                |  | 784041         |  |                |  |           |  |
| DESIGN   |  |                |  | SHT OF                   |  |                |  |                |  |           |  |
| DETAIL   |  | L.A.I.         |  | 4 JAN 77                 |  | WD FEB 77      |  |                |  |           |  |
| CHECK  |  | G.D.B.         |  | 3 FEB 77                 |  | CLASSIFICATION |  |                |  |           |  |
| APPRO  |  | R.C.M.         |  | 3 FEB 77                 |  | R.C.M.         |  | 28 FEB 77      |  |           |  |
|  |  |                |  | MUST CONFORM TO ENG SPEC |  |                |  | DEVELOPMENT NO |  |           |  |
|  |  |                |  |                          |  |                |  | LOGIC PG NO    |  |           |  |
|  |  |                |  |                          |  |                |  | WK020          |  |           |  |





## 50/60HZ PRIMARY INPUT AND CONVENIENCE OUTLET WITH STEP DOWN TRANSFORMER

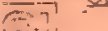




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| NAME                     | DATE     | CHANGE NO      | DATE | CHANGE NO |
|--------------------------|----------|----------------|------|-----------|
| DESIGN GB                | IDE C77  | SHT 7F         |      |           |
| DETAIL GB                | IDE C77  | VD NOV 77      |      |           |
| CHECK LAI                | IDE C77  | CLASSIFICATION |      |           |
| APPROV J.D.7             | P.F.C.77 |                |      |           |
| MUST CONFORM TO ENG SPEC |          |                |      |           |
| DEVELOPMENT NO           |          |                |      |           |
| LOGIC PG NO              |          |                |      |           |
| YF001                    |          |                |      |           |





|   |  |  |   |   |
|---|--|--|---|---|
| Model Number <b>25</b><br>Model Alternative <b>25</b><br>Comp. Design <b>25</b><br>Part Number <b>25</b><br>Surface Treatment <b>25</b> | Model Contains to Eng. Spec. <b>25-250</b><br>Tolerances Unless Noted<br>Line w/c<br>Angles w/c<br>Hole Unless Noted<br>1. Size/Corner Outside Diam<br>15 callout 15 callout | <br> | Scale: NONE<br>3 25 mm<br>Third Angle Projection<br> | Part Number<br>25 TRIPLE POWER SURVEY<br>Designer 15 JAN 77<br>Engineer 15 JAN 77<br>Checker 15 JAN 77<br>15 JAN 77 |
|---|--|--|---|---|

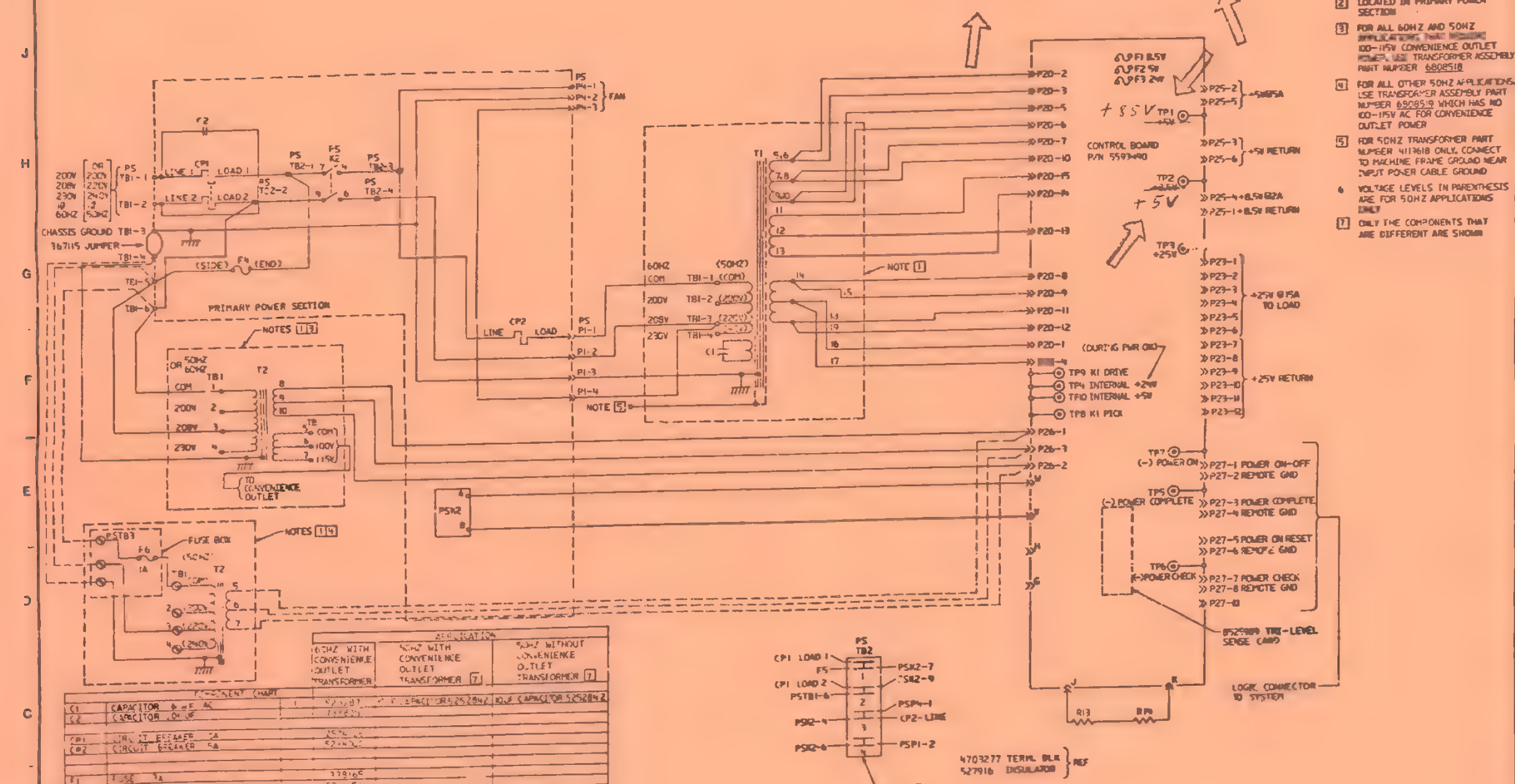




|                  |       |                    |               |                 |       |                 |                  |
|------------------|-------|--------------------|---------------|-----------------|-------|-----------------|------------------|
| Part No. 5593470 | Qty 1 | Technical Approval | Date 1 JUL 77 | EC No 751758    | Qty 1 | EC No 155985    | Part No. 5593471 |
| Development No.  |       | Development No.    |               | Development No. |       | Development No. |                  |

REFERENCE DRAWING  
REA 91-04696 PICK-UP EC 784027

- NOTES
- REFERENCE, LOCATED SEPARATE FROM POWER SUPPLY ASSEMBLY
  - LOCATED IN PRIMARY POWER SECTION
  - FOR ALL 60HZ AND 50HZ APPLICATIONS, TRANSFORMER 100-115V CONVENIENCE OUTLET POWER, USE TRANSFORMER ASSEMBLY PART NUMBER 6808518
  - FOR ALL OTHER 50HZ APPLICATIONS, USE TRANSFORMER ASSEMBLY PART NUMBER 6808519 WHICH HAS NO 100-115V AC FOR CONVENIENCE OUTLET POWER
  - FOR 50HZ TRANSFORMER PART NUMBER 4119618 ONLY, CONNECT TO MACHINE FRAME GROUND NEAR INPUT POWER CABLE GROUND
  - VOLTAGE LEVELS IN PARENTHESES ARE FOR 50HZ APPLICATIONS ONLY
  - ONLY THE COMPONENTS THAT ARE DIFFERENT ARE SHOWN



| COMPONENT (PART) |                      | REPLACEMENT |             |
|------------------|----------------------|-------------|-------------|
| C1               | CAPACITOR 0.1 μF 50V | 0.1 μF 50V  | 0.1 μF 50V  |
| C2               | CAPACITOR 0.1 μF 50V | 0.1 μF 50V  | 0.1 μF 50V  |
| F1               | FUSE 1A              | 1A          | 1A          |
| F2               | FUSE 1A              | 1A          | 1A          |
| F3               | FUSE 1A              | 1A          | 1A          |
| F4               | FUSE 1A              | 1A          | 1A          |
| F5               | FUSE 1A              | 1A          | 1A          |
| F6               | FUSE 1A              | 1A          | 1A          |
| PSK2             | RELAY                | RELAY       | RELAY       |
| T1               | TRANSFORMER          | TRANSFORMER | TRANSFORMER |
| T2               | TRANSFORMER          | TRANSFORMER | TRANSFORMER |

|  |  |  |
|--|--|--|
| User Comments to Eng. Spec. 2349999<br>Tolerances Unless Noted<br>Unles:<br>Angles:<br>Radii Unless Noted<br>Edge/Corner Outside Min<br>Break Inside Max | Scale: NONE<br>0 25 100<br>Third Angle Projection<br>SI metric<br>AO | Title: WIRING DIAGRAM (50HZ)<br>50HZ TRI-LEVEL POWER SUPPLY<br>Designer: JCH 15 JAN 77<br>Checked: RED 15 JAN 77<br>Approved: JLD 15 JAN 77<br>Classification: JLD 15 JAN 77 |
|--|--|--|

5593471

YF005



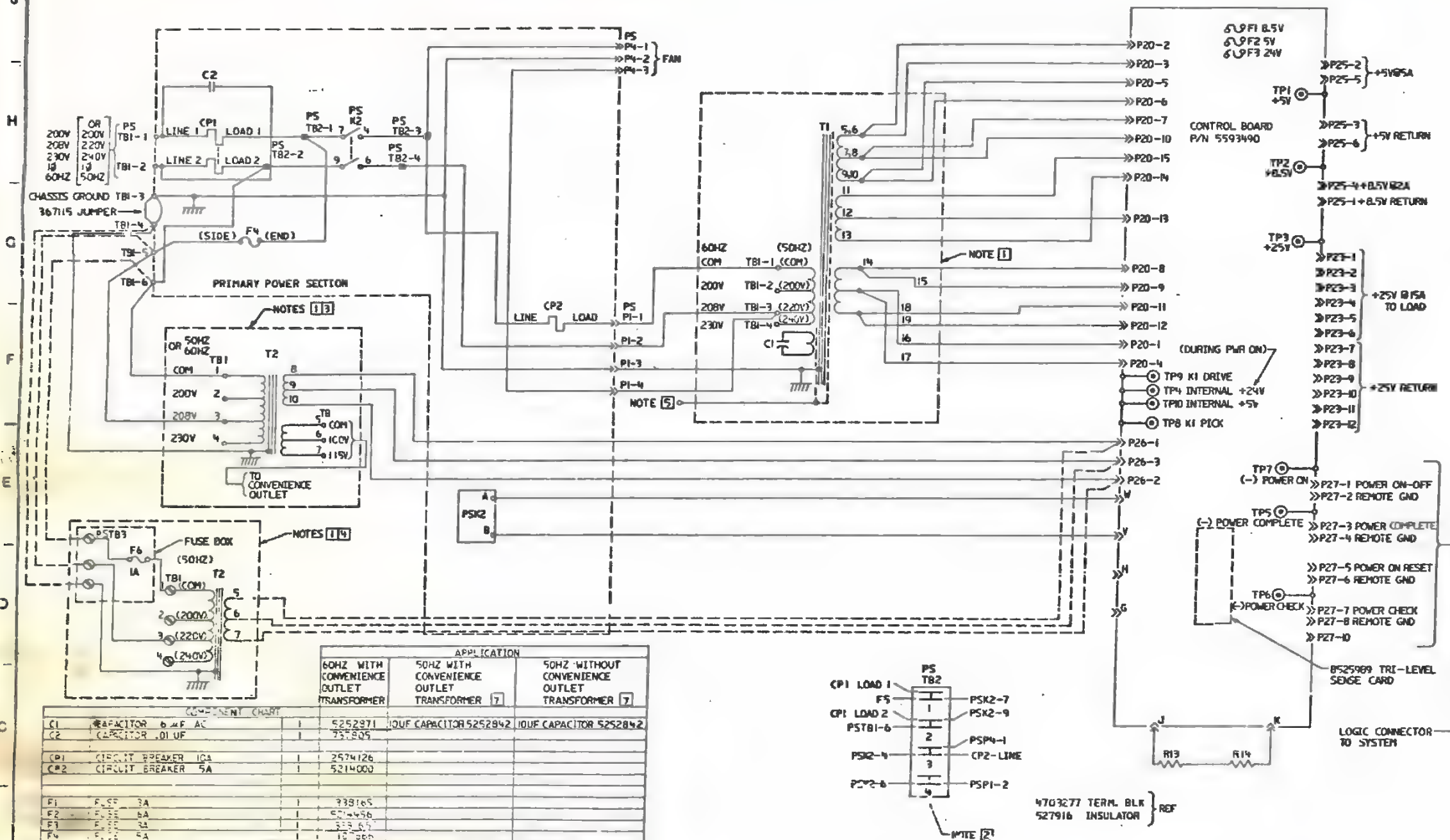


|                        |                 |     |
|------------------------|-----------------|-----|
| Part No. 5593471       | Development No. | Q/M |
| EC No. 751358          | EC No. 155985   |     |
| 1 JUL 77               | 1 FEB 78        |     |
| Technical Approval     | EC No.          |     |
| Electrical             |                 |     |
| Material               |                 |     |
| Rel. for Assn. 5593470 | Qty 1           |     |

# REFERENCE DRAWING

## NOTES

- REFERENCE, LOCATED SEPARATE FROM POWER SUPPLY ASSEMBLY
- LOCATED IN PRIMARY POWER SECTION
- FOR ALL 60HZ AND 50HZ APPLICATIONS THAT REQUIRE 100-115V CONVENIENCE OUTLET POWER, USE TRANSFORMER ASSEMBLY PART NUMBER 6508518
- FOR ALL OTHER 50HZ APPLICATIONS, USE TRANSFORMER ASSEMBLY PART NUMBER 6508519 WHICH HAS NO 100-115V AC FOR CONVENIENCE OUTLET POWER
- FOR 50HZ TRANSFORMER PART NUMBER 4119618 ONLY, CONNECT TO MACHINE FRAME GROUND NEAR INPUT POWER CABLE GROUND
- VOLTAGE LEVELS IN PARENTHESES ARE FOR 50HZ APPLICATIONS ONLY
- ONLY THE COMPONENTS THAT ARE DIFFERENT ARE SHOWN



| COMPONENT CHART |  |  |   |
|-----------------|--|--|---|
| APPLICATION     |  |  |   |
|                 | 60HZ WITH CONVENIENCE OUTLET TRANSFORMER | 50HZ WITH CONVENIENCE OUTLET TRANSFORMER 7 | 50HZ WITHOUT CONVENIENCE OUTLET TRANSFORMER 7 |
| C1              | 100UF CAPACITOR 6.3V AC                  | 5252971                                    | 100UF CAPACITOR 5252842                       |
| C2              | 100UF CAPACITOR .01 UF                   | 737505                                     |   |
| CP1             | CIRCUIT BREAKER 10A                      | 2574126                                    |   |
| CP2             | CIRCUIT BREAKER 5A                       | 5214000                                    |   |
| F1              | FUSE 3A                                  | 338165                                     |   |
| F2              | FUSE 6A                                  | 5214456                                    |   |
| F3              | FUSE 3A                                  | 338165                                     |   |
| F4              | FUSE 6A                                  | 5214456                                    |   |
| F5              | FUSE 3A (REFERENCE ONLY)                 |  | 252591  |
| F6              | FUSE 6A                                  | 252591                                     |   |
| PS, R4          | RESISTOR 10.0 50W                        | 222128                                     |   |
| T1              | TRANSFORMER 100/115V 15A                 | 6508518                                    | 4119618 TRANSFORMER                           |
| T2              | TRANSFORMER 100/115V 15A                 | 6508519                                    | 4119618 TRANSFORMER                           |

|                    |                                    |             |  |   |
|--------------------|------------------------------------|-------------|--|---|
| IBM Material No.   | Must Conform to Eng. Spec. 2149999 | Scale: NONE |  | Title: 50HZ TRI-LEVEL POWER SUPPLY<br>Designer: JCH 15 JAN 77<br>Checker: RED 15 JAN 77<br>Approved: JLD 15 JAN 77<br>Date: 15 JAN 77 |
| Mail Alternate No. | Tolerances Unless Noted            | 0 25 mm     |  |   |
| Case Draft         | Linear ±                           |             |  |   |
| Hardness           | Angles ±                           |             |  |   |
| Surface Treatment  | Radius Unless Noted                |             |  |   |
|                    | Edge/Corner Outside Max            |             |  |   |
|                    | Breaks Inside Max                  |             |  |   |

5593471



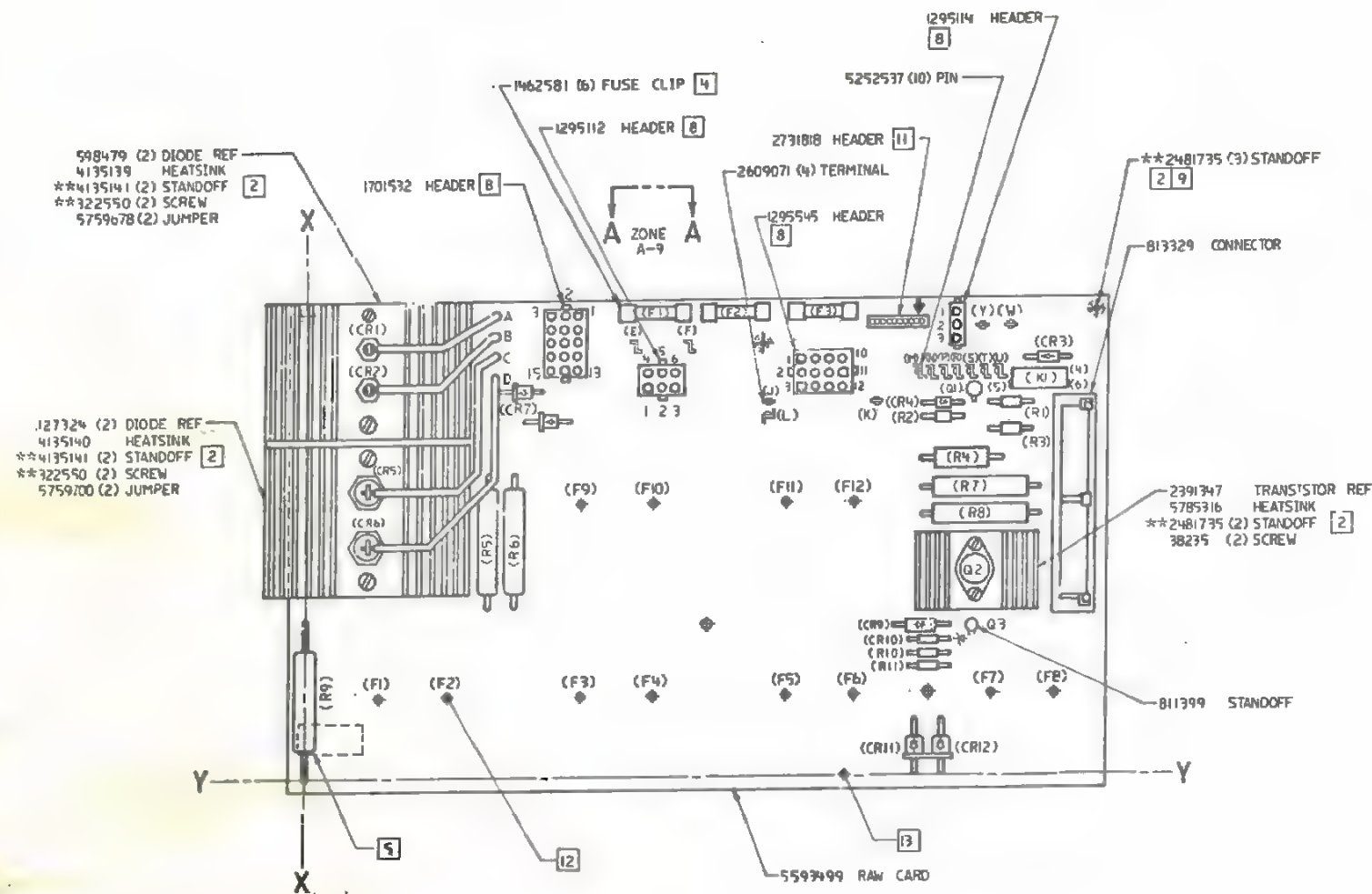


|                        |          |  |  |                                      |               |                    |                |
|------------------------|----------|--|--|--------------------------------------|---------------|--------------------|----------------|
| Rel for Asm<br>5593470 | Qty<br>1 | Technical Approval<br>Electrical<br>Material | Date<br>1 JUL 77<br>5 DEC 77<br>4 MAY 78 | EC No<br>751358<br>751358C<br>784029 | Date<br>EC No | Part No<br>5593490 | Development No |
|------------------------|----------|--|--|--------------------------------------|---------------|--------------------|----------------|

1-2

NOTES

- 1 FUSE CLIP PART NUMBER 1462581 MUST BE ORIENTATED AS SHOWN
- 2 STANDOFFS MUST WITHSTAND A MINIMUM TORQUE OF 13 CM/KGF AFTER SWAGING AND SOLDERING
- 3
- 4
- 5 MARK THE FOLLOWING INFORMATION ON THE BACK SIDE OF CARD AS SHOWN WITH 1.5 HIGH NON-MAGNETIC GOTHIC PRINTING APPROXIMATELY AS SHOWN.  
ASM 5593490  
E.C.  
DATE OF ASM
- 6 COMPONENT DESIGNATIONS IN PARENTHESIS ARE FOR REFERENCE ONLY
- 7
- 8 HEADER MUST BE ORIENTATED AS SHOWN
- 9 STANDOFF TO BE INSERTED FROM BACK SIDE OF CARD ONLY. STANDOFF THREADS TO BE FREE OF ANY SOLDER
- 10 COMPONENT MUST BE .318 OFF SURFACE OF BOARD
- 11 HEADER MUST BE ORIENTATED SO MISSING PIN IS IN POSITION INDICATED BY ARROW
- 12 LANDS AROUND HOLES F1-F12 TO BE FREE OF ANY SOLDER WITHIN .4 OF EDGE OF HOLE
- 13 THIS HOLE FOR MANUFACTURING PURPOSES ONLY



| ELECTRICAL COMPONENT CHART |                 |          |             |
|----------------------------|-----------------|----------|-------------|
| COMPONENT                  | DESCRIPTION     | QUANTITY | PART NUMBER |
| R1                         | RES 2 KΩ .5 W   | 1        | 317019      |
| R2                         | RES 47Ω .5 W    | 1        | 216421      |
| R3                         | RES 4.3 KΩ .5 W | 1        | 317023      |
| R4                         | RES 330 Ω .5 W  | 1        | 207325      |
| R5, R6                     | RES 10 Ω 10 W   | 2        | 556485      |
| R7                         | RES 36 Ω 10 W   | 1        | 2396721     |
| R8                         | RES 250 Ω 10 W  | 1        | 2102363     |
| R9                         | RES 30 Ω 10 W   | 1        | 2154981     |
| R10                        | RES 620 Ω .5 W  | 1        | 317013      |
| R11                        | RES 300 Ω .5 W  | 1        | 317008      |
| CR1, CR2                   | DIODE 10 A      | 2        | 598479      |
| CR3, CR4                   | DIODE (AM)      | 2        | 2111292     |
| CR5, CR6                   | DIODE 30 A      | 2        | 127324      |
| CR7, CR8<br>CR11, CR12     | DIODE 3 A       | 4        | 5252534     |
| CR9                        | DIODE (G1)      | 1        | 2414810     |
| CR10                       | DIODE (BLS)     | 1        | 492496      |
| F1, F3                     | FUSE 3A 125 V   | 2        | 338165      |
| F2                         | FUSE 6A 250V    | 1        | 5214456     |
| K1                         | RELAY           | 1        | 5252649     |
| Q1                         | TRANSISTOR 237  | 1        | 2396887     |
| Q2                         | TRANSISTOR 359  | 1        | 2391347     |
| Q3                         | TRANSISTOR 194  | 1        | 2414818     |

\*\*DENOTES MULTIPLE USAGE

|                   |                                 |
|-------------------|---------------------------------|
| IBM Material No   | Must Conform to Eng Spec 234999 |
| Matl Alternate No | B90913                          |
| Case Depth        | Tolerances Unless Noted         |
| Hardness          | Linear ±                        |
| Surface Treatment | Angles ±                        |
| Code No           | Radius Unless Noted             |
|                   | Edge/Corner Outside Max         |
|                   | Breaks Inside Max               |

|           |                        |
|-----------|------------------------|
| Scale 1/1 | metric                 |
| 0 25 mm   | Third Angle Projection |
| AO        |                        |

|                       |               |
|-----------------------|---------------|
| YF006                 |               |
| Title CARD ASSEMBLY - |               |
| Design                | RED 26 JAN 77 |
| Checked               | PS 26 JAN 77  |
| Approved              | 26 JAN 77     |

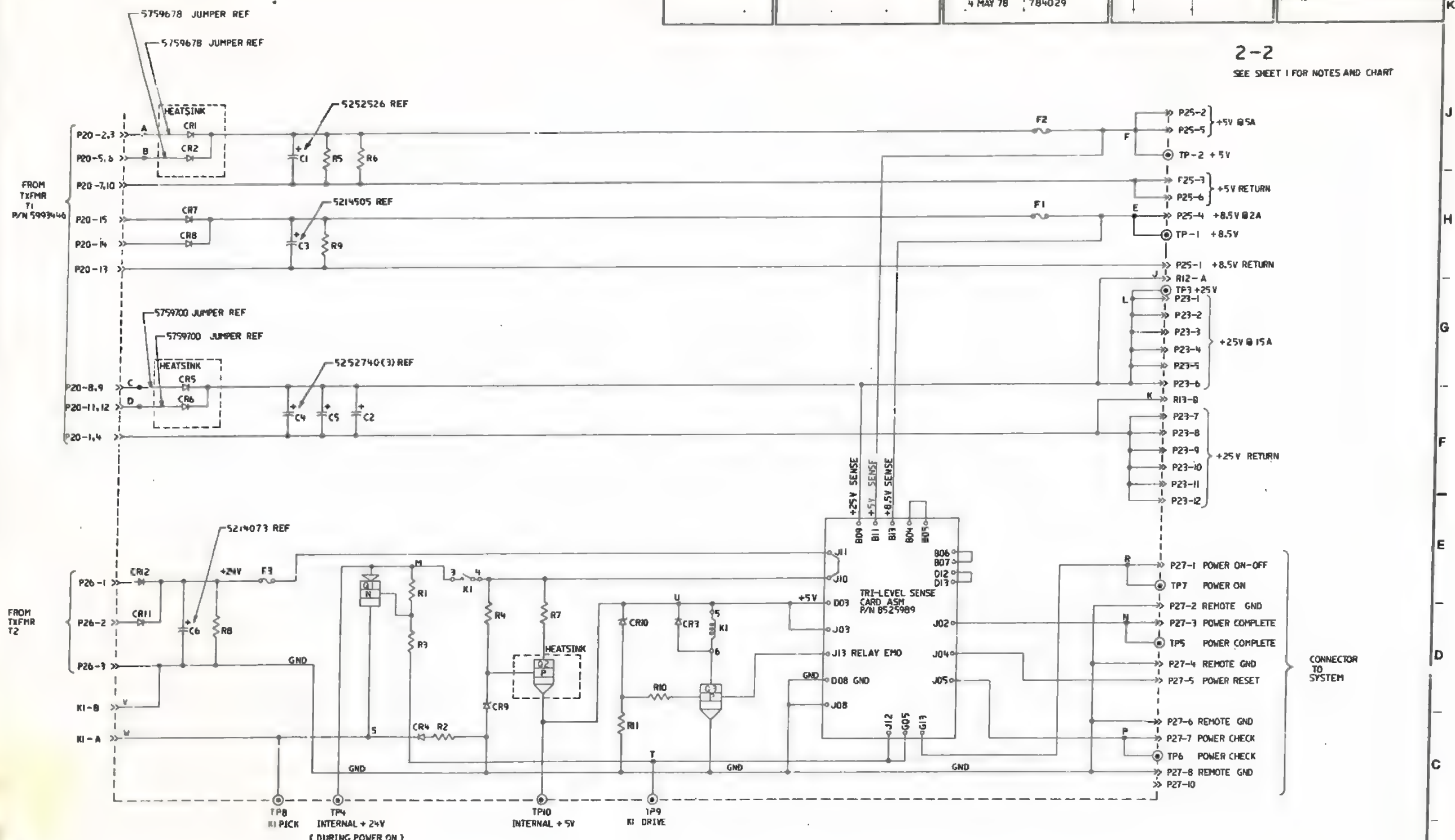
1-2  
5593490





|                         |          |  |  |                                      |               |                    |                       |
|-------------------------|----------|--|--|--------------------------------------|---------------|--------------------|-----------------------|
| Ref for Assn<br>5593470 | Qty<br>1 | Technical Approval<br>Electrical<br>Material | Date<br>1 JUL 77<br>5 DEC 77<br>4 MAY 78 | EC No<br>751358<br>751358C<br>784029 | Date<br>EC No | Part No<br>5593490 | Development No<br>C/M |
|-------------------------|----------|--|--|--------------------------------------|---------------|--------------------|-----------------------|

2-2  
SEE SHEET 1 FOR NOTES AND CHART



2-2

5593490

YF007

|                           |   |                        |   |   |
|---------------------------|---|------------------------|---|---|
| IBM Material No<br>990913 | Must Conform to Eng Spec: 2343999, 890913       | Scale 1/1<br>0 25 mm   |   | This document is the property of IBM. Its use is authorized only for the performance of work for IBM. All other rights are reserved to IBM. |
| Mat Alternate No          | Tolerances Unless Noted<br>Linear ±<br>Angles ± | Third Angle Projection |   |   |
| Case Depth                | Radius Unless Noted                             | Edge/Corner            | The WIRE DIAGRAM FOR CONTROL BOARD<br>Designer JCM 26 JAN 77<br>Checked RED 26 JAN 77<br>Approved JLD 26 JAN 77 | Breaks<br>Inside Max  |
| Surface Treatment         | Code No   | Breaks<br>Outside Max  |   |   |











C

4703187

MOD II

PART NO  
4703187

LOGIC PG NO  
ZA010

W010 -DATA BIT 0  
W010 -DATA BIT 1  
W010 -DATA BIT 2  
W010 -DATA BIT 3  
W010 -DATA BIT 4  
W010 -DATA BIT 5  
W010 -DATA BIT 6  
W010 -DATA BIT 7  
W010 -STROBE  
W010 -PARITY BIT  
W010 -FIRE TIER 1  
W010 -FIRE TIER 2  
W010 -FIRE TIER 3  
W010 -FIRE TIER 4  
W010 -FIRE TIER 5  
Z0030 -FIRE  
Z0035 -PRINT SUB SCAN

NOTE 1. \_\_\_\_\_ 012

CONTINUED ON ZA020

A1-02  
011

W010 -NOT PRINT TIME  
ZA120, ZA040 -NOT PRINT TIME DICES  
W010 -DATA PARITY CHECK

| TOP CARD CONNECTION |           |           |     |
|---------------------|-----------|-----------|-----|
| W010 LATCH CARD     |           | W010 CARD |     |
| Y13                 | -FIRE 2   | Y13       | 002 |
| Y12                 | -FIRE 4   | Y12       | 003 |
| Y11                 | -FIRE 6   | Y11       | 004 |
| Y10                 | -FIRE 8   | Y10       | 005 |
| Y09                 | -FIRE 10  | Y09       | 006 |
| Y08                 | -FIRE 12  | Y08       | 007 |
| Y07                 | -FIRE 14  | Y07       | 008 |
| Y06                 | -FIRE 16  | Y06       | 009 |
| Y05                 | -FIRE 18  | Y05       | 010 |
| Y04                 | -FIRE 20  | Y04       | 011 |
| Y03                 | -FIRE 22  | Y03       | 012 |
| Y02                 | -FIRE 24  | Y02       | 013 |
| Y01                 | -FIRE 26  | Y01       | 014 |
| Y00                 | -FIRE 28  | Y00       | 015 |
| Y00                 | -FIRE 30  | Y00       | 016 |
| Y00                 | -FIRE 32  | Y00       | 017 |
| Y00                 | -FIRE 34  | Y00       | 018 |
| Y00                 | -FIRE 36  | Y00       | 019 |
| Y00                 | -FIRE 38  | Y00       | 020 |
| Y00                 | -FIRE 40  | Y00       | 021 |
| Y00                 | -FIRE 42  | Y00       | 022 |
| Y00                 | -FIRE 44  | Y00       | 023 |
| Y00                 | -FIRE 46  | Y00       | 024 |
| Y00                 | -FIRE 48  | Y00       | 025 |
| Y00                 | -FIRE 50  | Y00       | 026 |
| Y00                 | -FIRE 52  | Y00       | 027 |
| Y00                 | -FIRE 54  | Y00       | 028 |
| Y00                 | -FIRE 56  | Y00       | 029 |
| Y00                 | -FIRE 58  | Y00       | 030 |
| Y00                 | -FIRE 60  | Y00       | 031 |
| Y00                 | -FIRE 62  | Y00       | 032 |
| Y00                 | -FIRE 64  | Y00       | 033 |
| Y00                 | -FIRE 66  | Y00       | 034 |
| Y00                 | -FIRE 68  | Y00       | 035 |
| Y00                 | -FIRE 70  | Y00       | 036 |
| Y00                 | -FIRE 72  | Y00       | 037 |
| Y00                 | -FIRE 74  | Y00       | 038 |
| Y00                 | -FIRE 76  | Y00       | 039 |
| Y00                 | -FIRE 78  | Y00       | 040 |
| Y00                 | -FIRE 80  | Y00       | 041 |
| Y00                 | -FIRE 82  | Y00       | 042 |
| Y00                 | -FIRE 84  | Y00       | 043 |
| Y00                 | -FIRE 86  | Y00       | 044 |
| Y00                 | -FIRE 88  | Y00       | 045 |
| Y00                 | -FIRE 90  | Y00       | 046 |
| Y00                 | -FIRE 92  | Y00       | 047 |
| Y00                 | -FIRE 94  | Y00       | 048 |
| Y00                 | -FIRE 96  | Y00       | 049 |
| Y00                 | -FIRE 98  | Y00       | 050 |
| Y00                 | -FIRE 100 | Y00       | 051 |
| Y00                 | -FIRE 102 | Y00       | 052 |
| Y00                 | -FIRE 104 | Y00       | 053 |
| Y00                 | -FIRE 106 | Y00       | 054 |
| Y00                 | -FIRE 108 | Y00       | 055 |
| Y00                 | -FIRE 110 | Y00       | 056 |
| Y00                 | -FIRE 112 | Y00       | 057 |
| Y00                 | -FIRE 114 | Y00       | 058 |
| Y00                 | -FIRE 116 | Y00       | 059 |
| Y00                 | -FIRE 118 | Y00       | 060 |
| Y00                 | -FIRE 120 | Y00       | 061 |
| Y00                 | -FIRE 122 | Y00       | 062 |
| Y00                 | -FIRE 124 | Y00       | 063 |
| Y00                 | -FIRE 126 | Y00       | 064 |
| Y00                 | -FIRE 128 | Y00       | 065 |
| Y00                 | -FIRE 130 | Y00       | 066 |
| Y00                 | -FIRE 132 | Y00       | 067 |
| Y00                 | -FIRE 134 | Y00       | 068 |
| Y00                 | -FIRE 136 | Y00       | 069 |
| Y00                 | -FIRE 138 | Y00       | 070 |
| Y00                 | -FIRE 140 | Y00       | 071 |
| Y00                 | -FIRE 142 | Y00       | 072 |
| Y00                 | -FIRE 144 | Y00       | 073 |
| Y00                 | -FIRE 146 | Y00       | 074 |
| Y00                 | -FIRE 148 | Y00       | 075 |
| Y00                 | -FIRE 150 | Y00       | 076 |
| Y00                 | -FIRE 152 | Y00       | 077 |
| Y00                 | -FIRE 154 | Y00       | 078 |
| Y00                 | -FIRE 156 | Y00       | 079 |
| Y00                 | -FIRE 158 | Y00       | 080 |
| Y00                 | -FIRE 160 | Y00       | 081 |
| Y00                 | -FIRE 162 | Y00       | 082 |
| Y00                 | -FIRE 164 | Y00       | 083 |
| Y00                 | -FIRE 166 | Y00       | 084 |
| Y00                 | -FIRE 168 | Y00       | 085 |
| Y00                 | -FIRE 170 | Y00       | 086 |
| Y00                 | -FIRE 172 | Y00       | 087 |
| Y00                 | -FIRE 174 | Y00       | 088 |
| Y00                 | -FIRE 176 | Y00       | 089 |
| Y00                 | -FIRE 178 | Y00       | 090 |
| Y00                 | -FIRE 180 | Y00       | 091 |
| Y00                 | -FIRE 182 | Y00       | 092 |
| Y00                 | -FIRE 184 | Y00       | 093 |
| Y00                 | -FIRE 186 | Y00       | 094 |
| Y00                 | -FIRE 188 | Y00       | 095 |
| Y00                 | -FIRE 190 | Y00       | 096 |
| Y00                 | -FIRE 192 | Y00       | 097 |
| Y00                 | -FIRE 194 | Y00       | 098 |
| Y00                 | -FIRE 196 | Y00       | 099 |
| Y00                 | -FIRE 198 | Y00       | 100 |
| Y00                 | -FIRE 200 | Y00       | 101 |
| Y00                 | -FIRE 202 | Y00       | 102 |
| Y00                 | -FIRE 204 | Y00       | 103 |
| Y00                 | -FIRE 206 | Y00       | 104 |
| Y00                 | -FIRE 208 | Y00       | 105 |
| Y00                 | -FIRE 210 | Y00       | 106 |
| Y00                 | -FIRE 212 | Y00       | 107 |
| Y00                 | -FIRE 214 | Y00       | 108 |
| Y00                 | -FIRE 216 | Y00       | 109 |
| Y00                 | -FIRE 218 | Y00       | 110 |
| Y00                 | -FIRE 220 | Y00       | 111 |
| Y00                 | -FIRE 222 | Y00       | 112 |
| Y00                 | -FIRE 224 | Y00       | 113 |
| Y00                 | -FIRE 226 | Y00       | 114 |
| Y00                 | -FIRE 228 | Y00       | 115 |
| Y00                 | -FIRE 230 | Y00       | 116 |
| Y00                 | -FIRE 232 | Y00       | 117 |
| Y00                 | -FIRE 234 | Y00       | 118 |
| Y00                 | -FIRE 236 | Y00       | 119 |
| Y00                 | -FIRE 238 | Y00       | 120 |
| Y00                 | -FIRE 240 | Y00       | 121 |
| Y00                 | -FIRE 242 | Y00       | 122 |
| Y00                 | -FIRE 244 | Y00       | 123 |
| Y00                 | -FIRE 246 | Y00       | 124 |
| Y00                 | -FIRE 248 | Y00       | 125 |
| Y00                 | -FIRE 250 | Y00       | 126 |
| Y00                 | -FIRE 252 | Y00       | 127 |
| Y00                 | -FIRE 254 | Y00       | 128 |
| Y00                 | -FIRE 256 | Y00       | 129 |
| Y00                 | -FIRE 258 | Y00       | 130 |
| Y00                 | -FIRE 260 | Y00       | 131 |
| Y00                 | -FIRE 262 | Y00       | 132 |

NOTE:  
1. FLOAT PIN 0012 ON MOD II.

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|                      |        |         |                |                          |  |                |  |             |  |
|----------------------|--------|---------|----------------|--------------------------|--|----------------|--|-------------|--|
| NAME                 |        | DATE    |                | CHANGE NO                |  | DATE           |  | CHANGE NO   |  |
| HWR LATCH & HWR DATA |        | 22JAN77 |                | 149529U                  |  |                |  |             |  |
| EVEN MOD II          |        | 10AUG77 |                | 359424                   |  |                |  |             |  |
| DESIGN               |        | SMT     | OF             |                          |  |                |  |             |  |
| DETAIL               | L.A.I. | 13JAN77 | VD FEB77       |                          |  |                |  |             |  |
| CHECK                | G.D.B. | 18AUG77 | CLASSIFICATION |                          |  |                |  |             |  |
| APPRO                | R.C.M. | 9TEB77  | 18AUG77        | MUST CONFORM TO ENG SPEC |  | DEVELOPMENT NO |  | LOGIC PG NO |  |
|                      |        |         |                |                          |  |                |  | ZA010       |  |

IBM 4703187

4703187





C

4703188

MOD II

PART NO  
4703188

LOGIC PG NO  
ZA020

CONTINUED FROM 2A018

| HMR LATCH CARD |     | FEED THRU CARD |     | TOP CARD CONNECTOR |     | HMR DRIVE CARD |                |
|----------------|-----|----------------|-----|--------------------|-----|----------------|----------------|
| 602            | P13 | V13            | 1   | V13                | 1   | 2A110          | -HMR DRIVE 1   |
| 603            | P13 | V12            | 5   | V12                | 5   | 2A110          | -HMR DRIVE 3   |
| 604            | P12 | V11            | 7   | V11                | 7   | 2A110          | -HMR DRIVE 5   |
| 605            | P11 | V10            | 9   | V10                | 9   | 2A110          | -HMR DRIVE 7   |
| 606            | P10 | V09            | 13  | V09                | 13  | 2A110          | -HMR DRIVE 9   |
| 607            | P09 | V08            | 15  | V08                | 15  | 2A110          | -HMR DRIVE 11  |
| 608            | P08 | V07            | 17  | V07                | 17  | 2A110          | -HMR DRIVE 13  |
| 609            | P07 | V06            | 19  | V06                | 19  | 2A110          | -HMR DRIVE 15  |
| 610            | P06 | V05            | 21  | V05                | 21  | 2A110          | -HMR DRIVE 17  |
| 611            | P05 | V04            | 23  | V04                | 23  | 2A110          | -HMR DRIVE 19  |
| 612            | P04 | V03            | 25  | V03                | 25  | 2A110          | -HMR DRIVE 21  |
| 613            | P03 | V02            | 27  | V02                | 27  | 2A110          | -HMR DRIVE 23  |
| 614            | P02 | V01            | 29  | V01                | 29  | 2A110          | -HMR DRIVE 25  |
| 615            | P01 | V00            | 31  | V00                | 31  | 2A110          | -HMR DRIVE 27  |
| 616            | P00 | V99            | 33  | V99                | 33  | 2A110          | -HMR DRIVE 29  |
| 617            | P99 | V98            | 35  | V98                | 35  | 2A110          | -HMR DRIVE 31  |
| 618            | P98 | V97            | 37  | V97                | 37  | 2A110          | -HMR DRIVE 33  |
| 619            | P97 | V96            | 39  | V96                | 39  | 2A110          | -HMR DRIVE 35  |
| 620            | P96 | V95            | 41  | V95                | 41  | 2A110          | -HMR DRIVE 37  |
| 621            | P95 | V94            | 43  | V94                | 43  | 2A110          | -HMR DRIVE 39  |
| 622            | P94 | V93            | 45  | V93                | 45  | 2A110          | -HMR DRIVE 41  |
| 623            | P93 | V92            | 47  | V92                | 47  | 2A110          | -HMR DRIVE 43  |
| 624            | P92 | V91            | 49  | V91                | 49  | 2A110          | -HMR DRIVE 45  |
| 625            | P91 | V90            | 51  | V90                | 51  | 2A110          | -HMR DRIVE 47  |
| 626            | P90 | V89            | 53  | V89                | 53  | 2A110          | -HMR DRIVE 49  |
| 627            | P89 | V88            | 55  | V88                | 55  | 2A110          | -HMR DRIVE 51  |
| 628            | P88 | V87            | 57  | V87                | 57  | 2A110          | -HMR DRIVE 53  |
| 629            | P87 | V86            | 59  | V86                | 59  | 2A110          | -HMR DRIVE 55  |
| 630            | P86 | V85            | 61  | V85                | 61  | 2A110          | -HMR DRIVE 57  |
| 631            | P85 | V84            | 63  | V84                | 63  | 2A110          | -HMR DRIVE 59  |
| 632            | P84 | V83            | 65  | V83                | 65  | 2A110          | -HMR DRIVE 61  |
| 633            | P83 | V82            | 67  | V82                | 67  | 2A110          | -HMR DRIVE 63  |
| 634            | P82 | V81            | 69  | V81                | 69  | 2A110          | -HMR DRIVE 65  |
| 635            | P81 | V80            | 71  | V80                | 71  | 2A110          | -HMR DRIVE 67  |
| 636            | P80 | V79            | 73  | V79                | 73  | 2A110          | -HMR DRIVE 69  |
| 637            | P79 | V78            | 75  | V78                | 75  | 2A110          | -HMR DRIVE 71  |
| 638            | P78 | V77            | 77  | V77                | 77  | 2A110          | -HMR DRIVE 73  |
| 639            | P77 | V76            | 79  | V76                | 79  | 2A110          | -HMR DRIVE 75  |
| 640            | P76 | V75            | 81  | V75                | 81  | 2A110          | -HMR DRIVE 77  |
| 641            | P75 | V74            | 83  | V74                | 83  | 2A110          | -HMR DRIVE 79  |
| 642            | P74 | V73            | 85  | V73                | 85  | 2A110          | -HMR DRIVE 81  |
| 643            | P73 | V72            | 87  | V72                | 87  | 2A110          | -HMR DRIVE 83  |
| 644            | P72 | V71            | 89  | V71                | 89  | 2A110          | -HMR DRIVE 85  |
| 645            | P71 | V70            | 91  | V70                | 91  | 2A110          | -HMR DRIVE 87  |
| 646            | P70 | V69            | 93  | V69                | 93  | 2A110          | -HMR DRIVE 89  |
| 647            | P69 | V68            | 95  | V68                | 95  | 2A110          | -HMR DRIVE 91  |
| 648            | P68 | V67            | 97  | V67                | 97  | 2A110          | -HMR DRIVE 93  |
| 649            | P67 | V66            | 99  | V66                | 99  | 2A110          | -HMR DRIVE 95  |
| 650            | P66 | V65            | 101 | V65                | 101 | 2A110          | -HMR DRIVE 97  |
| 651            | P65 | V64            | 103 | V64                | 103 | 2A110          | -HMR DRIVE 99  |
| 652            | P64 | V63            | 105 | V63                | 105 | 2A110          | -HMR DRIVE 101 |
| 653            | P63 | V62            | 107 | V62                | 107 | 2A110          | -HMR DRIVE 103 |
| 654            | P62 | V61            | 109 | V61                | 109 | 2A110          | -HMR DRIVE 105 |
| 655            | P61 | V60            | 111 | V60                | 111 | 2A110          | -HMR DRIVE 107 |
| 656            | P60 | V59            | 113 | V59                | 113 | 2A110          | -HMR DRIVE 109 |
| 657            | P59 | V58            | 115 | V58                | 115 | 2A110          | -HMR DRIVE 111 |
| 658            | P58 | V57            | 117 | V57                | 117 | 2A110          | -HMR DRIVE 113 |
| 659            | P57 | V56            | 119 | V56                | 119 | 2A110          | -HMR DRIVE 115 |
| 660            | P56 | V55            | 121 | V55                | 121 | 2A110          | -HMR DRIVE 117 |
| 661            | P55 | V54            | 123 | V54                | 123 | 2A110          | -HMR DRIVE 119 |
| 662            | P54 | V53            | 125 | V53                | 125 | 2A110          | -HMR DRIVE 121 |
| 663            | P53 | V52            | 127 | V52                | 127 | 2A110          | -HMR DRIVE 123 |
| 664            | P52 | V51            | 129 | V51                | 129 | 2A110          | -HMR DRIVE 125 |
| 665            | P51 | V50            | 131 | V50                | 131 | 2A110          | -HMR DRIVE 127 |
| 666            | P50 | V49            | 133 | V49                | 133 | 2A110          | -HMR DRIVE 129 |
| 667            | P49 | V48            | 135 | V48                | 135 | 2A110          | -HMR DRIVE 131 |
| 668            | P48 | V47            | 137 | V47                | 137 | 2A110          | -HMR DRIVE 133 |
| 669            | P47 | V46            | 139 | V46                | 139 | 2A110          | -HMR DRIVE 135 |
| 670            | P46 | V45            | 141 | V45                | 141 | 2A110          | -HMR DRIVE 137 |
| 671            | P45 | V44            | 143 | V44                | 143 | 2A110          | -HMR DRIVE 139 |
| 672            | P44 | V43            | 145 | V43                | 145 | 2A110          | -HMR DRIVE 141 |
| 673            | P43 | V42            | 147 | V42                | 147 | 2A110          | -HMR DRIVE 143 |
| 674            | P42 | V41            | 149 | V41                | 149 | 2A110          | -HMR DRIVE 145 |
| 675            | P41 | V40            | 151 | V40                | 151 | 2A110          | -HMR DRIVE 147 |
| 676            | P40 | V39            | 153 | V39                | 153 | 2A110          | -HMR DRIVE 149 |
| 677            | P39 | V38            | 155 | V38                | 155 | 2A110          | -HMR DRIVE 151 |
| 678            | P38 | V37            | 157 | V37                | 157 | 2A110          | -HMR DRIVE 153 |
| 679            | P37 | V36            | 159 | V36                | 159 | 2A110          | -HMR DRIVE 155 |
| 680            | P36 | V35            | 161 | V35                | 161 | 2A110          | -HMR DRIVE 157 |
| 681            | P35 | V34            | 163 | V34                | 163 | 2A110          | -HMR DRIVE 159 |
| 682            | P34 | V33            | 165 | V33                | 165 | 2A110          | -HMR DRIVE 161 |
| 683            | P33 | V32            | 167 | V32                | 167 | 2A110          | -HMR DRIVE 163 |
| 684            | P32 | V31            | 169 | V31                | 169 | 2A110          | -HMR DRIVE 165 |
| 685            | P31 | V30            | 171 | V30                | 171 | 2A110          | -HMR DRIVE 167 |
| 686            | P30 | V29            | 173 | V29                | 173 | 2A110          | -HMR DRIVE 169 |
| 687            | P29 | V28            | 175 | V28                | 175 | 2A110          | -HMR DRIVE 171 |
| 688            | P28 | V27            | 177 | V27                | 177 | 2A110          | -HMR DRIVE 173 |
| 689            | P27 | V26            | 179 | V26                | 179 | 2A110          | -HMR DRIVE 175 |
| 690            | P26 | V25            | 181 | V25                | 181 | 2A110          | -HMR DRIVE 177 |
| 691            | P25 | V24            | 183 | V24                | 183 | 2A110          | -HMR DRIVE 179 |
| 692            | P24 | V23            | 185 | V23                | 185 | 2A110          | -HMR DRIVE 181 |
| 693            | P23 | V22            | 187 | V22                | 187 | 2A110          | -HMR DRIVE 183 |
| 694            | P22 | V21            | 189 | V21                | 189 | 2A110          | -HMR DRIVE 185 |
| 695            | P21 | V20            | 191 | V20                | 191 | 2A110          | -HMR DRIVE 187 |
| 696            | P20 | V19            | 193 | V19                | 193 | 2A110          | -HMR DRIVE 189 |
| 697            | P19 | V18            | 195 | V18                | 195 | 2A110          | -HMR DRIVE 191 |
| 698            | P18 | V17            | 197 | V17                | 197 | 2A110          | -HMR DRIVE 193 |
| 699            | P17 | V16            | 199 | V16                | 199 | 2A110          | -HMR DRIVE 195 |
| 700            | P16 | V15            | 201 | V15                | 201 | 2A110          | -HMR DRIVE 197 |
| 701            | P15 | V14            | 203 | V14                | 203 | 2A110          | -HMR DRIVE 199 |
| 702            | P14 | V13            | 205 | V13                | 205 | 2A110          | -HMR DRIVE 201 |
| 703            | P13 | V12            | 207 | V12                | 207 | 2A110          | -HMR DRIVE 203 |
| 704            | P12 | V11            | 209 | V11                | 209 | 2A110          | -HMR DRIVE 205 |
| 705            | P11 | V10            | 211 | V10                | 211 | 2A110          | -HMR DRIVE 207 |
| 706            | P10 | V09            | 213 | V09                | 213 | 2A110          | -HMR DRIVE 209 |
| 707            | P09 | V08            | 215 | V08                | 215 | 2A110          | -HMR DRIVE 211 |
| 708            | P08 | V07            | 217 | V07                | 217 | 2A110          | -HMR DRIVE 213 |
| 709            | P07 | V06            | 219 | V06                | 219 | 2A110          | -HMR DRIVE 215 |
| 710            | P06 | V05            | 221 | V05                | 221 | 2A110          | -HMR DRIVE 217 |
| 711            | P05 | V04            | 223 | V04                | 223 | 2A110          | -HMR DRIVE 219 |
| 712            | P04 | V03            | 225 | V03                | 225 | 2A110          | -HMR DRIVE 221 |
| 713            | P03 | V02            | 227 | V02                | 227 | 2A110          | -HMR DRIVE 223 |
| 714            | P02 | V01            | 229 | V01                | 229 | 2A110          | -HMR DRIVE 225 |
| 715            | P01 | V00            | 231 | V00                | 231 | 2A110          | -HMR DRIVE 227 |
| 716            | P00 | V99            | 233 | V99                | 233 | 2A110          | -HMR DRIVE 229 |
| 717            | P99 | V98            | 235 | V98                | 235 | 2A110          | -HMR DRIVE 231 |
| 718            | P98 | V97            | 237 | V97                | 237 | 2A110          | -HMR DRIVE 233 |
| 719            | P97 | V96            | 239 | V96                | 239 | 2A110          | -HMR DRIVE 235 |
| 720            | P96 | V95            | 241 | V95                | 241 | 2A110          | -HMR DRIVE 237 |
| 721            | P95 | V94            | 243 | V94                | 243 | 2A110          | -HMR DRIVE 239 |
| 722            | P94 | V93            | 245 | V93                | 245 | 2A110          | -HMR DRIVE 241 |
| 723            | P93 | V92            | 247 | V92                | 247 | 2A110          | -HMR DRIVE 243 |
| 724            | P92 | V91            | 249 | V91                | 249 | 2A110          | -HMR DRIVE 245 |
| 725            | P91 | V90            | 251 | V90                | 251 | 2A110          | -HMR DRIVE 247 |
| 726            | P90 | V89            | 253 | V89                | 253 | 2A110          | -HMR DRIVE 249 |
| 727            | P89 | V88            | 255 | V88                | 255 | 2A110          | -HMR DRIVE 251 |
| 728            | P88 | V87            | 257 | V87                | 257 | 2A110          | -HMR DRIVE 253 |
| 729            | P87 | V86            | 259 | V86                | 259 | 2A110          | -HMR DRIVE 255 |
| 730            | P86 | V85            | 261 | V85                | 261 | 2A110          | -HMR DRIVE 257 |
| 731            | P85 | V84            | 263 | V84                | 263 | 2A110          | -HMR DRIVE 259 |
| 732            | P84 | V83            | 265 | V83                | 265 | 2A110          | -HMR DRIVE 261 |
| 733            | P83 | V82            | 267 | V82                | 267 | 2A110          | -HMR DRIVE 263 |
| 734            | P82 | V81            | 269 | V81                | 269 | 2A110          | -HMR DRIVE 265 |
| 735            | P81 | V80            | 271 | V80                | 271 | 2A110          | -HMR DRIVE 267 |
| 736            | P80 | V79            | 273 | V79                | 273 | 2A110          | -HMR DRIVE 269 |
| 737            | P79 | V78            | 275 | V78                | 275 | 2A110          | -HMR DRIVE 271 |
| 738            | P78 | V77            | 277 | V77                | 277 | 2A110          | -HMR DRIVE 273 |
| 739            | P77 | V76            | 279 | V76                | 279 | 2A110          | -HMR DRIVE 275 |
| 740            | P76 | V75            | 281 | V75                | 281 | 2A110          | -HMR DRIVE 277 |
| 741            | P75 | V74            | 283 | V74                | 283 | 2A110          | -HMR DRIVE 279 |
| 742            | P74 | V73            | 285 | V73                | 285 | 2A110          | -HMR DRIVE 281 |
| 743            | P73 | V72            | 287 | V72                | 287 | 2A110          | -HMR DRIVE 283 |
| 744            | P72 | V71            | 289 | V71                | 289 | 2A110          | -HMR DRIVE 285 |
| 745            | P71 | V70            | 291 | V70                | 291 | 2A110          | -HMR DRIVE 287 |
| 746            | P70 | V69            | 293 | V69                | 293 | 2A110          | -HMR DRIVE 289 |
| 747            | P69 | V68            | 295 | V68                | 295 | 2A110          | -HMR DRIVE 291 |
| 748            | P68 | V67            | 297 | V67                | 297 | 2A110          | -HMR DRIVE 293 |
| 749            | P67 | V66            | 299 | V66                | 299 | 2A110          | -HMR DRIVE 295 |
| 750            | P66 | V65            | 301 | V65                | 301 | 2A110          | -HMR DRIVE 297 |
| 751            | P65 | V64            | 303 | V64                | 303 | 2A110          | -HMR DRIVE 299 |
| 752            | P64 | V63            | 305 | V63                | 305 | 2A110          | -HMR DRIVE 301 |
| 753            | P63 | V62            | 307 | V62                | 307 | 2A110          | -HMR DRIVE 303 |
| 754            | P62 | V61            | 309 | V61                | 309 | 2A110          | -HMR DRIVE 305 |
| 755            | P61 | V60            | 311 | V60                | 311 | 2A110          | -HMR DRIVE 307 |
| 756            | P60 | V59            | 313 | V59                | 313 | 2A110          | -HMR DRIVE 309 |
| 757            | P59 | V58            | 315 | V58                | 315 | 2A110          | -HMR DRIVE 311 |
| 758            | P58 | V57            | 317 | V57                |     |                |                |

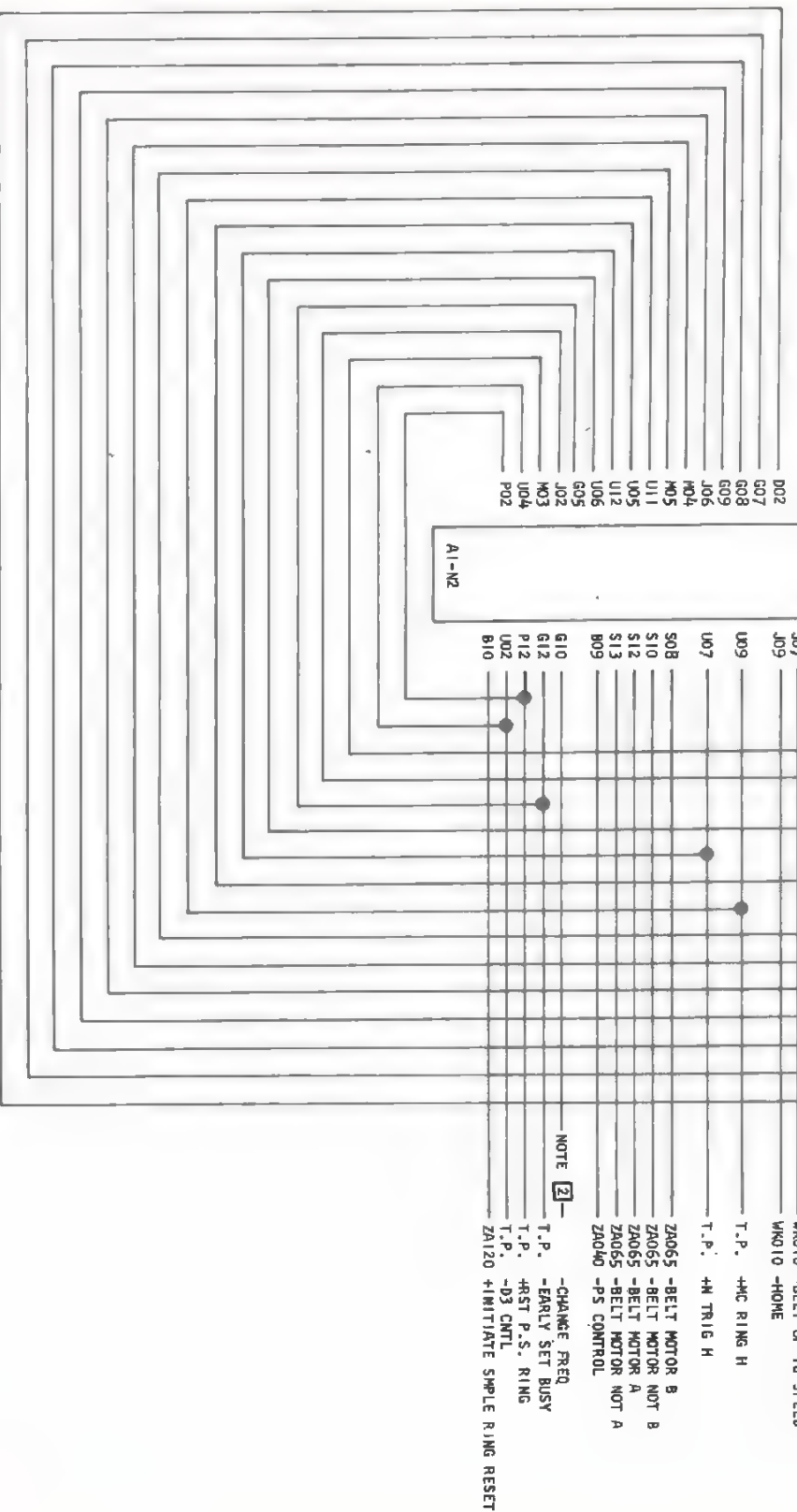
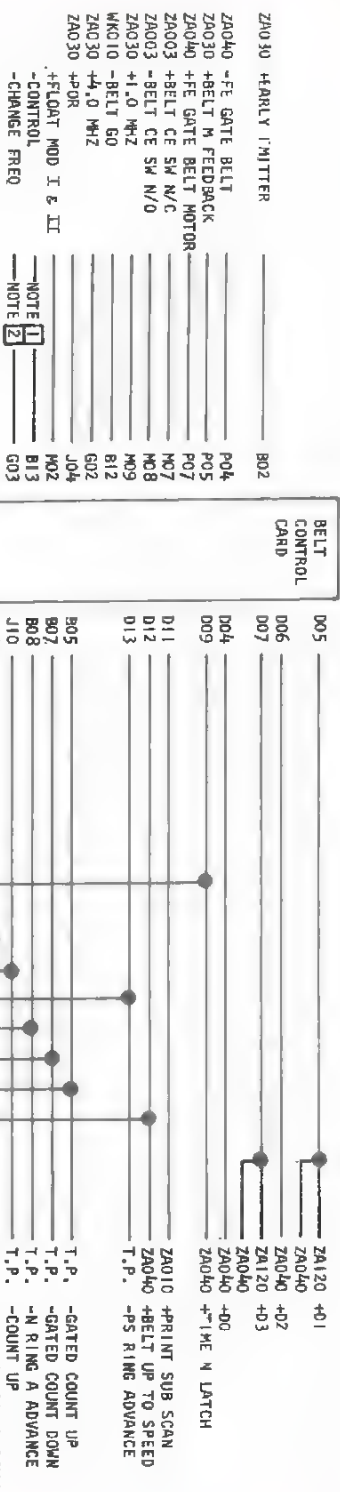












T.P. = TEST POINT ONLY

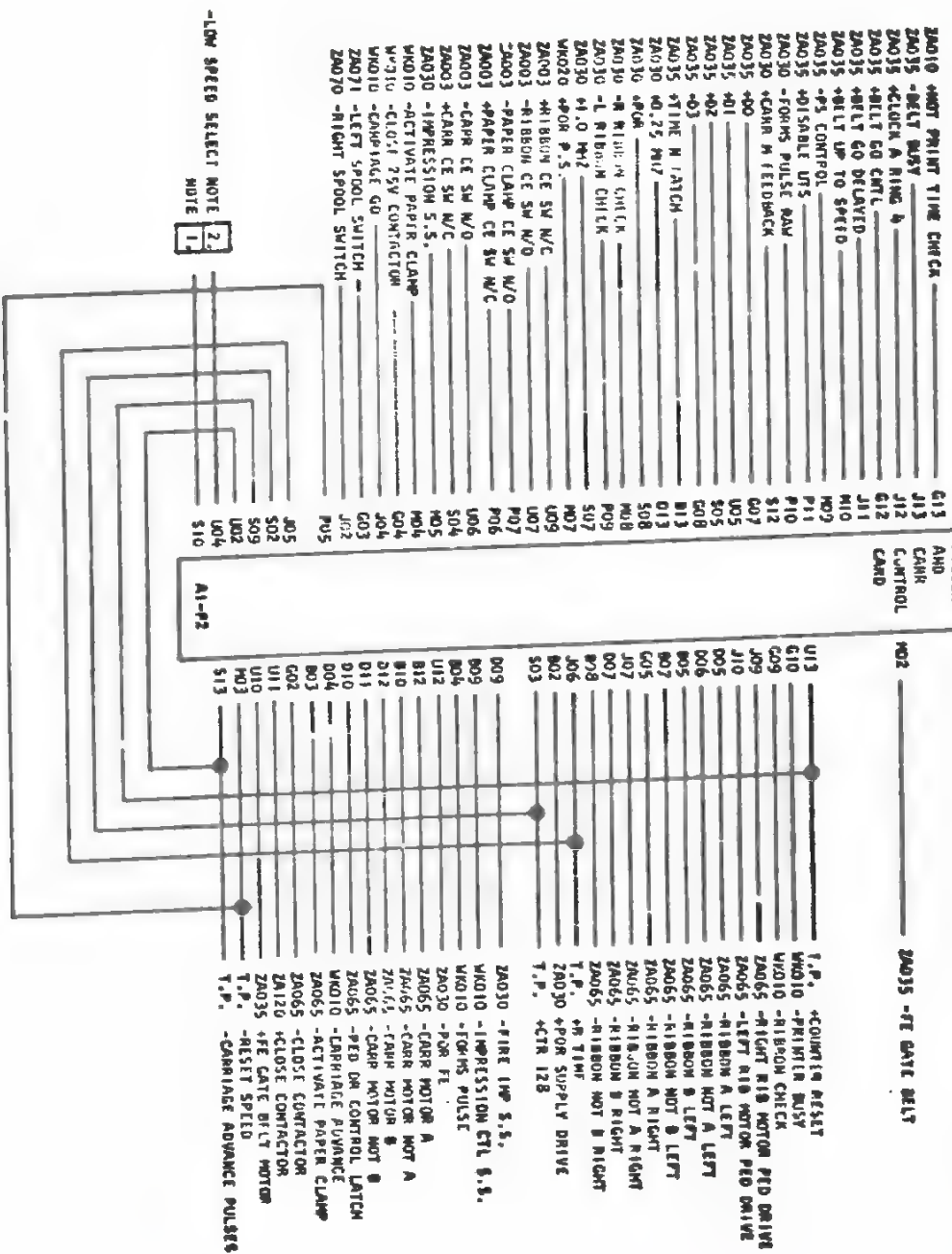
1. JUMPER PIN N2B13 TO N2D08 (GND) FOR ALL MODELS.
2. JUMPER PIN N2C03 TO N2G10 FOR MOD I & II.

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| NAME         |        | DATE                     | CHANGE NO      | DATE           | CHANGE NO   |
|--------------|--------|--------------------------|----------------|----------------|-------------|
| BELT CONTROL |        | 24JUN77                  | 495290         |                |             |
|              |        | 10AUG77                  | 359424         |                |             |
| DESIGN       | SHT OF | 60FC77                   | 356703         |                |             |
| DETAIL       | L.A. I | 2 FEB 77                 | WD FEB 77      |                |             |
| CHECK        | G.D.B. | 4 FEB 77                 | CLASSIFICATION |                |             |
| APPRO        | R.C.H. | 9 FEB 77                 | 1/2            | 28 FEB 77      |             |
|              |        | MUST CONFORM TO ENG SPEC |                | DEVELOPMENT NO | LOGIC PG NO |
|              |        |                          |                |                | ZA035       |







**T.P. = TEST POINT ONLY**

**NOTES:**

- |    |                                      |
|----|--------------------------------------|
| 1. | I/O PIN RESERVED FOR FEATURE WIRING. |
| 2. | I/O PIN USED FOR CARD TEST ONLY.     |

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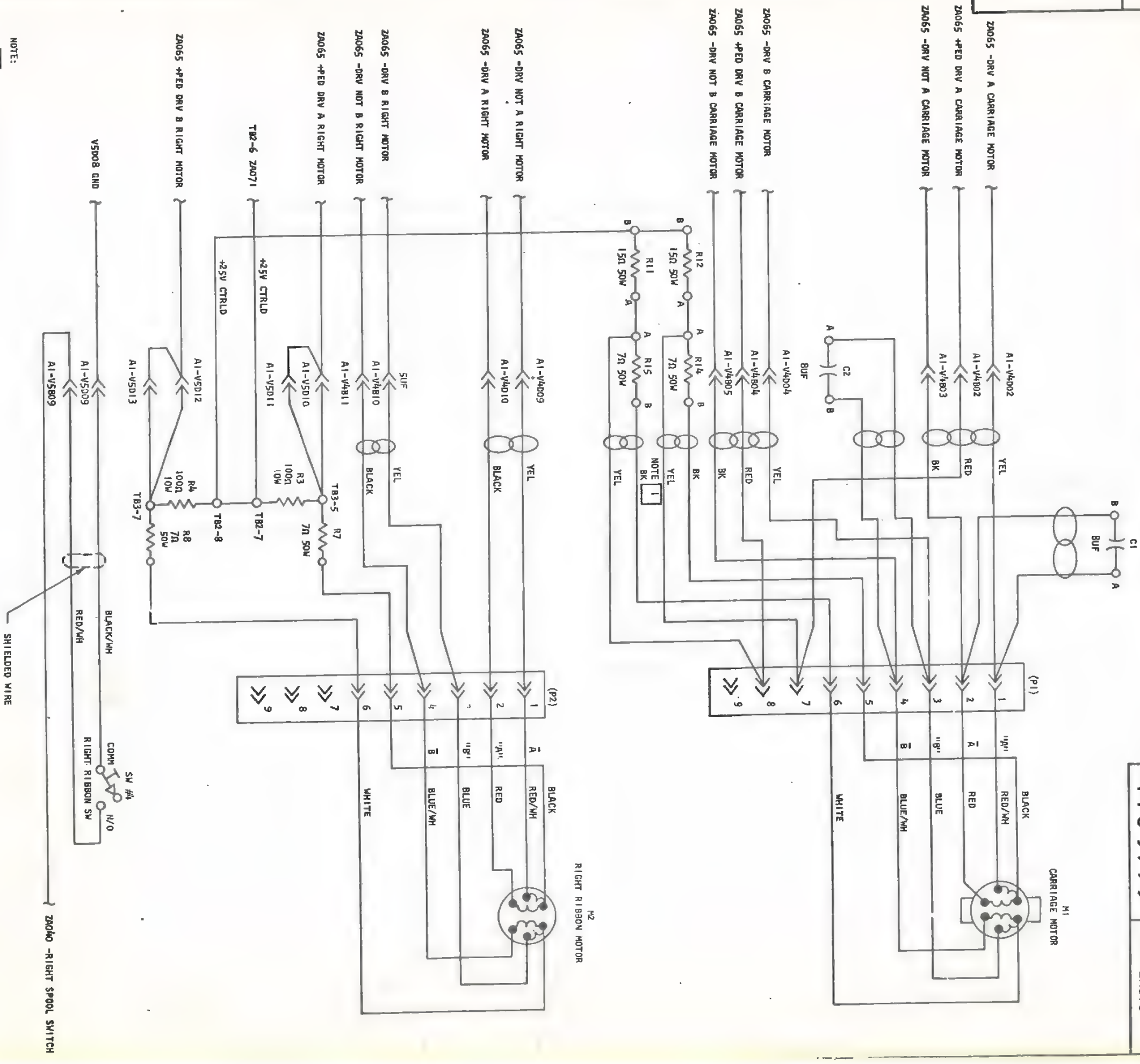
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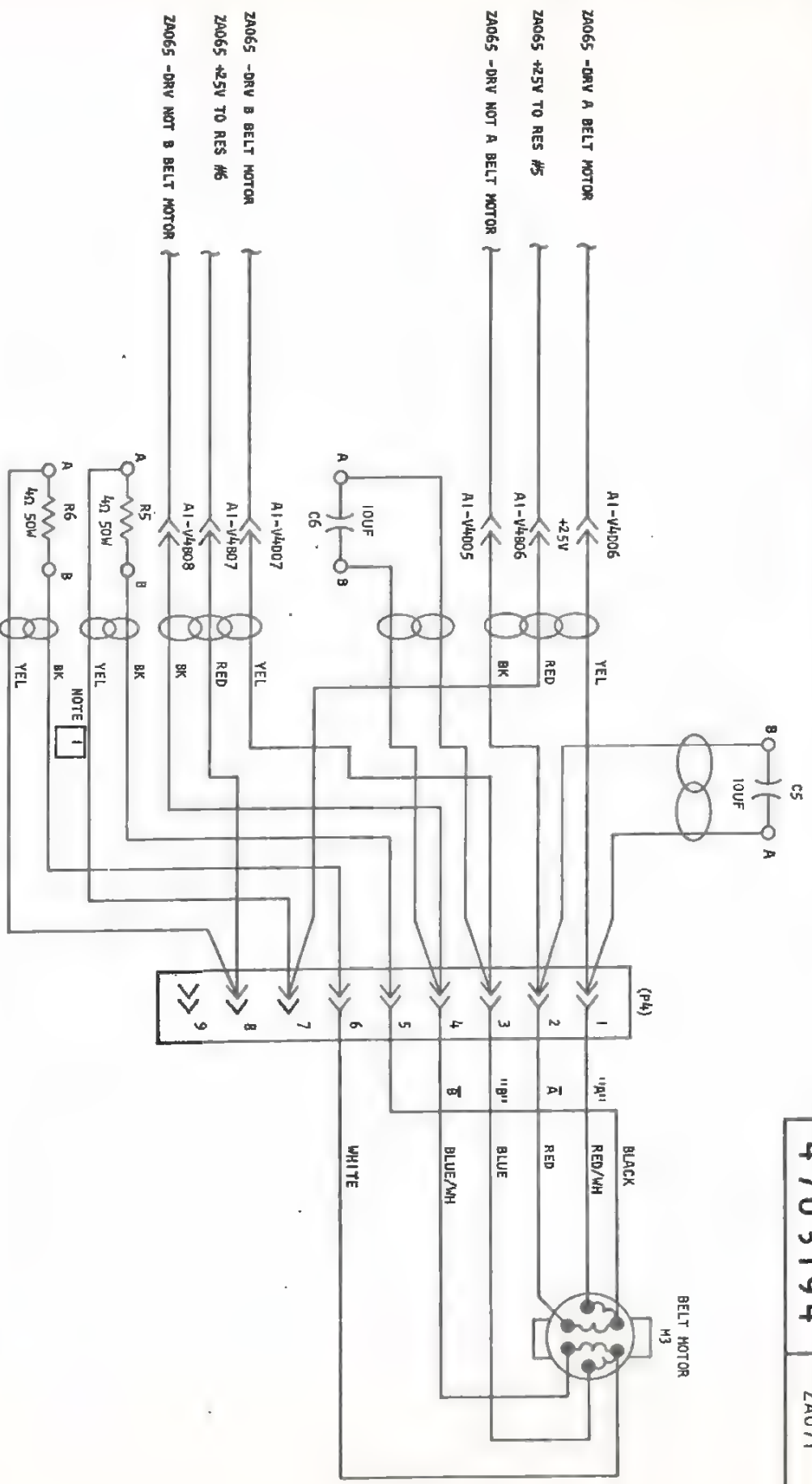
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|---|------------------------------|---------|----------------|--------------------------|----------------|-------------|--|--|--|
| IBM SYSTEMS   |                              |         | DATE           | CHANGE NO                | DATE           | CHANGE NO   |  |  |  |
| NAME  | CARRIAGE MOTOR, RIGHT R1880N |         | 24JAN77        | 149529U                  |                |             |  |  |  |
| MOTOR & RIGHT SPOOL SWITCH  |                              |         | 10AUE77        | 359424                   |                |             |  |  |  |
|   |                              |         | 6DEC77         | 356703                   |                |             |  |  |  |
| DESIGN  |                              | SHT OF  |                |                          |                |             |  |  |  |
| DETAIL  | L.A.1.                       | 12JAN77 | WD FEB77       | 359422                   |                |             |  |  |  |
| CHECK   | G.D.B.                       | 2FEB77  | CLASSIFICATION | MUST CONFORM TO ENG SPEC | DEVELOPMENT NO | LOGIC PG NO |  |  |  |
| APPRO   | R.C.H.                       | 9FEB77  | RCH            | 28FEB77                  |                | ZA070       |  |  |  |







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| NAME                          |        | DATE                     | CHANGE NO      | DATE        | CHANGE NO |
|-------------------------------|--------|--------------------------|----------------|-------------|-----------|
| BELT MOTOR, LEFT R180N MOTOR, |        | 24JAN77                  | 149529U        |             |           |
| LEFT SPOOL SWITCH             |        | 10AUG77                  | 359424         |             |           |
| DESIGN                        |        | SHT OF                   | 60EC77         | 356703      |           |
| DETAIL                        | L.A.1. | 25JAN77                  | WD FEB77       | 359422      |           |
| CHECK                         | G.O.B. | 28JAN77                  | CLASSIFICATION |             |           |
| APPRO                         | R.C.H. | 9FEB77                   | RCH            | 28FEB77     |           |
|                               |        | MUST CONFORM TO ENG SPEC | DEVELOPMENT NO | LOGIC PG NO |           |
|                               |        |                          |                | ZA071       |           |





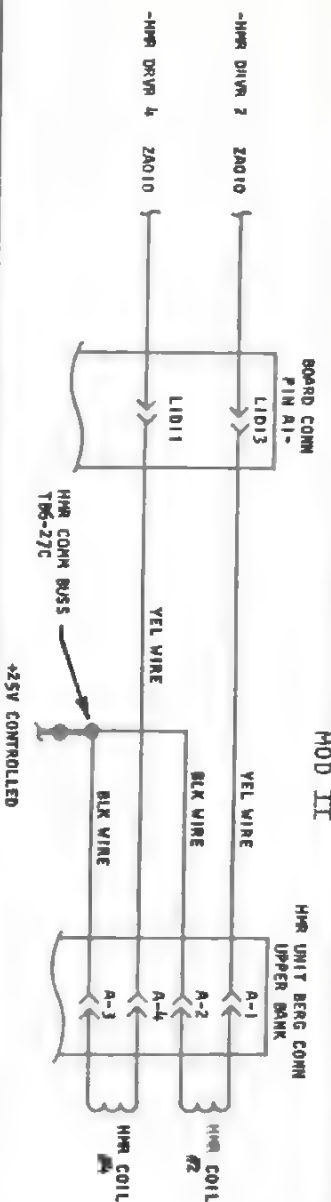






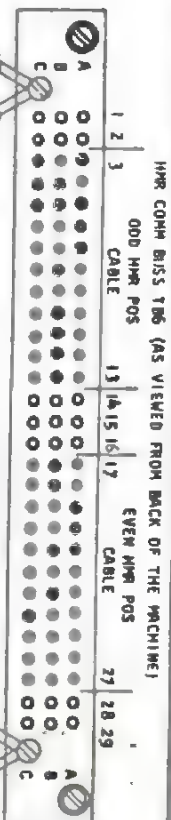
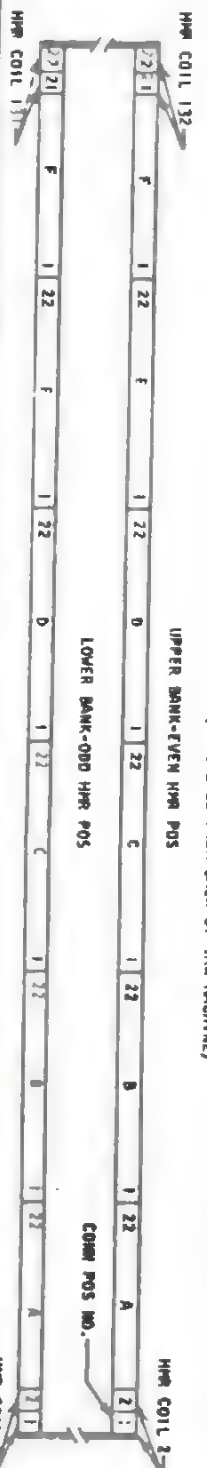






| HRR POS NO. AND<br>SOURCE PAGE | BOARD COMM<br>PIN (A-) | HRR UNIT<br>BRIG COMM<br>DRIVE | HRR UNIT<br>BRIG COMM<br>COMM | HRR COMM<br>BLISS (T0) |
|--------------------------------|------------------------|--------------------------------|-------------------------------|------------------------|
| 2 - ZA010                      | L1013                  | A-1                            | A-2                           | T06-27C                |
| 4 - ZA010                      | L1011                  | A-4                            | A-3                           |                        |
| 6 - ZA010                      | L1E13                  | A-5                            | A-6                           |                        |
| 8 - ZA010                      | L1E11                  | A-8                            | A-7                           | T06-27A                |
| 10 - ZA010                     | M1A13                  | A-9                            | A-10                          |                        |
| 12 - ZA010                     | M1A11                  | A-12                           | A-11                          | T06-27B                |
| 14 - ZA010                     | M1B13                  | A-13                           | A-14                          |                        |
| 16 - ZA010                     | M1B11                  | A-16                           | A-15                          |                        |
| 18 - ZA010                     | M1C13                  | A-17                           | A-18                          | T06-26C                |
| 20 - ZA010                     | M1C11                  | A-20                           | A-19                          |                        |
| 22 - ZA010                     | M1D13                  | A-21                           | A-22                          |                        |
| 24 - ZA010                     | M1D11                  | B-2                            | B-1                           | T06-26B                |
| 26 - ZA010                     | M1A13                  | B-3                            | B-4                           |                        |
| 28 - ZA010                     | M1A11                  | B-6                            | B-5                           |                        |
| 30 - ZA010                     | M1B13                  | B-7                            | B-8                           | T06-25C                |
| 32 - ZA010                     | M1B11                  | B-10                           | B-9                           |                        |
| 34 - ZA010                     | M1C13                  | B-11                           | B-12                          |                        |
| 36 - ZA010                     | M1C11                  | B-14                           | B-13                          | T06-25B                |
| 38 - ZA010                     | M1D13                  | B-15                           | B-16                          |                        |
| 40 - ZA010                     | M1D11                  | B-18                           | B-17                          |                        |
| 42 - ZA010                     | M1E13                  | B-19                           | B-20                          | T06-24C                |
| 44 - ZA010                     | M1E11                  | B-22                           | B-21                          |                        |
| 46 - ZA010                     | P1E13                  | C-1                            | C-2                           |                        |
| 48 - ZA010                     | P1E11                  | C-4                            | C-3                           | T06-24B                |
| 50 - ZA010                     | Q1A13                  | C-5                            | C-6                           |                        |
| 52 - ZA010                     | Q1A11                  | C-8                            | C-7                           |                        |
| 54 - ZA010                     | Q1B13                  | C-9                            | C-10                          | T06-23C                |
| 56 - ZA010                     | Q1B11                  | C-12                           | C-11                          |                        |
| 58 - ZA010                     | Q1C13                  | C-13                           | C-14                          |                        |
| 60 - ZA010                     | Q1C11                  | C-16                           | C-15                          | T06-23B                |
| 62 - ZA010                     | Q1D13                  | C-17                           | C-18                          |                        |
| 64 - ZA010                     | Q1D11                  | C-20                           | C-19                          |                        |
| 66 - ZA010                     | Q1E13                  | C-21                           | C-22                          | T06-22C                |
| 68 - ZA010                     | Q1E11                  | D-2                            | D-1                           |                        |
|                                |                        |                                |                               | T06-22A                |

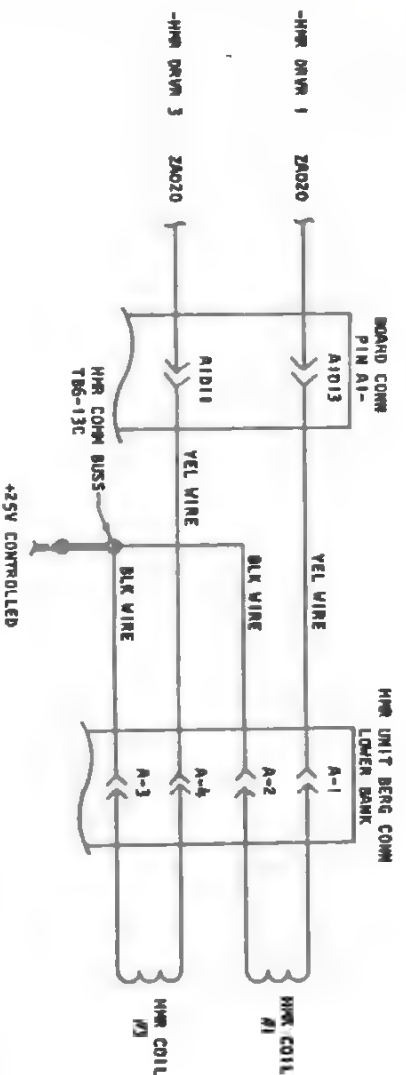
| HMR POS NO. AND SOURCE PAGE | BOARD COMM PIN (A-) | HMR UNIT AERC COMM DRIVE | HMR UNIT DEEC COMM COMM | HMR COMM BUS (7B) |
|-----------------------------|---------------------|--------------------------|-------------------------|-------------------|
| 70 - 2A010                  | R1B13               | D-3                      | D-4                     | 7B6-22B           |
| 72 - 2A010                  | R1B11               | D-5                      | D-5                     |                   |
| 74 - 2A010                  | R1C13               | D-7                      | D-8                     |                   |
| 76 - 2A010                  | R1C11               | D-10                     | D-9                     | 7B6-21C           |
| 78 - 2A010                  | R1D13               | D-11                     | D-12                    | 7B6-21A           |
| 80 - 2A010                  | R1D11               | D-14                     | D-13                    |                   |
| 82 - 2A010                  | R1E13               | D-15                     | D-16                    |                   |
| 84 - 2A010                  | R1E11               | D-18                     | D-17                    | 7B6-21B           |
| 86 - 2A010                  | S1A13               | D-19                     | D-20                    | 7B6-20C           |
| 88 - 2A010                  | S1A11               | D-22                     | D-21                    |                   |
| 90 - 2A010                  | T1A13               | E-1                      | E-2                     |                   |
| 92 - 2A010                  | T1A11               | E-4                      | E-3                     | 7B6-20A           |
| 94 - 2A010                  | T1B13               | E-5                      | E-6                     | 7B6-20B           |
| 96 - 2A010                  | T1B11               | E-8                      | E-7                     |                   |
| 98 - 2A010                  | T1C13               | E-9                      | E-10                    |                   |
| 100 - 2A010                 | T1C11               | E-12                     | E-11                    | 7B6-19C           |
| 102 - 2A010                 | T1D13               | E-13                     | E-14                    | 7B6-19A           |
| 104 - 2A010                 | T1D11               | E-16                     | E-15                    |                   |
| 106 - 2A010                 | T1E13               | E-17                     | E-18                    |                   |
| 108 - 2A010                 | T1E11               | E-20                     | E-19                    | 7B6-19B           |
| 110 - 2A010                 | U1A13               | E-21                     | E-22                    | 7B6-18C           |
| 112 - 2A010                 | U1A11               | F-2                      | F-1                     |                   |
| 114 - 2A010                 | U1C13               | F-3                      | F-4                     |                   |
| 116 - 2A010                 | U1C11               | F-6                      | F-5                     | 7B6-18A           |
| 118 - 2A010                 | U1D13               | F-7                      | F-8                     | 7B6-18B           |
| 120 - 2A010                 | U1D11               | F-10                     | F-9                     |                   |
| 122 - 2A010                 | U1E13               | F-11                     | F-12                    |                   |
| 124 - 2A010                 | U1E11               | F-14                     | F-13                    | 7B6-17C           |
| 126 - 2A010                 | V1A13               | F-15                     | F-16                    | 7B6-17A           |
| 128 - 2A010                 | V1A11               | F-18                     | F-17                    |                   |
| 130 - 2A010                 | V1B13               | F-19                     | F-20                    |                   |
| 132 - 2A010                 | V1B11               | F-22                     | F-21                    | 7B6-17B           |



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| NAME                            |        | DATE    | CHANGE NO      | DATE        | CHANGE NO |
|---------------------------------|--------|---------|----------------|-------------|-----------|
| HMR COILS FURN POSITIONS MOD IT |        | 26JAN77 | 1493290        |             |           |
|                                 |        | 60EC77  | 356703         |             |           |
| DESIGN                          |        | SHIT OF |                |             |           |
| DETAIL                          | L.A.T. | 20JAN77 | WD FEB77       |             |           |
| CHECK                           | G.O.B. | 22JAN77 | CLASSIFICATION |             |           |
| APPROD                          | R.C.M. | 9FEB77  | PAF 1847877    |             |           |
| MUST CONFORM TO ENG SPEC        |        |         | DEVELOPMENT NO | LOGIC PG NO |           |
|                                 |        |         |                | ZA100       |           |





| HMR POS NO. AND SOURCE PAGE | BOARD COMM P/H (A1-1) | HMR UNIT BRG COMM D/V/F | HMR UNIT BRG COMM COMM | HMR COMM BUSS (T/B) |
|-----------------------------|-----------------------|-------------------------|------------------------|---------------------|
| 1 - ZA020                   | A1D13                 | A-1                     | A-2                    | T06-13C             |
| 3 - ZA020                   | A1D11                 | A-4                     | A-3                    |                     |
| 5 - ZA020                   | A1E13                 | A-5                     | A-6                    |                     |
| 7 - ZA020                   | A1E11                 | A-8                     | A-7                    |                     |
| 9 - ZA020                   | B1A13                 | A-9                     | A-10                   | T06-13B             |
| 11 - ZA020                  | B1A11                 | A-12                    | A-11                   |                     |
| 13 - ZA020                  | B1B13                 | A-13                    | A-14                   |                     |
| 15 - ZA020                  | B1B11                 | A-16                    | A-15                   |                     |
| 17 - ZA020                  | B1C13                 | A-17                    | A-18                   | T06-12A             |
| 19 - ZA020                  | B1C11                 | A-20                    | A-19                   |                     |
| 21 - ZA020                  | B1D13                 | A-21                    | A-22                   |                     |
| 23 - ZA020                  | B1D11                 | B-2                     | B-1                    |                     |
| 25 - ZA020                  | C1A13                 | B-3                     | B-4                    | T06-11C             |
| 27 - ZA020                  | C1A11                 | B-6                     | B-5                    |                     |
| 29 - ZA020                  | C1B13                 | B-7                     | B-8                    |                     |
| 31 - ZA020                  | C1B11                 | B-10                    | B-9                    |                     |
| 33 - ZA020                  | C1C13                 | B-11                    | B-12                   | T06-11B             |
| 35 - ZA020                  | C1C11                 | B-16                    | B-13                   |                     |
| 37 - ZA020                  | C1D13                 | B-15                    | B-16                   |                     |
| 39 - ZA020                  | C1D11                 | B-18                    | B-17                   |                     |
| 41 - ZA020                  | C1E13                 | B-19                    | B-20                   | T06-10A             |
| 43 - ZA020                  | C1E11                 | B-22                    | B-21                   |                     |
| 45 - ZA020                  | D1E13                 | C-1                     | C-2                    |                     |
| 47 - ZA020                  | D1E11                 | C-4                     | C-3                    |                     |
| 49 - ZA020                  | E1A13                 | C-5                     | C-6                    | T06-9C              |
| 51 - ZA020                  | E1A11                 | C-8                     | C-7                    |                     |
| 53 - ZA020                  | E1B13                 | C-9                     | C-10                   |                     |
| 55 - ZA020                  | E1B11                 | C-12                    | C-11                   |                     |
| 57 - ZA020                  | E1C13                 | C-13                    | C-16                   | T06-9B              |
| 59 - ZA020                  | E1C11                 | C-16                    | C-15                   |                     |
| 61 - ZA020                  | E1D13                 | C-17                    | C-18                   |                     |
| 63 - ZA020                  | E1D11                 | C-20                    | C-19                   |                     |
| 65 - ZA020                  | E1E13                 | C-21                    | C-22                   | T06-0A              |
| 67 - ZA020                  | E1E11                 | D-2                     | D-1                    |                     |

| HRM POS NO. AND<br>SOURCE PAGE | BOARD COMM<br>PIN (A-I) | HRM UNIT<br>BERG COMM<br>DRIVE | HRM UNIT<br>BERG COMM<br>COWM | HRM COMM<br>BUS (78) |
|--------------------------------|-------------------------|--------------------------------|-------------------------------|----------------------|
| 69 - 2A020                     | F1B13                   | D-3                            | D-4                           | T06-08               |
| 71 - 2A020                     | F1B11                   | D-6                            | D-5                           |                      |
| 73 - 2A020                     | F1C13                   | D-7                            | D-8                           | T06-7C               |
| 75 - 2A020                     | F1C11                   | D-10                           | D-9                           |                      |
| 77 - 2A020                     | F1D13                   | D-11                           | D-12                          | T06-7A               |
| 79 - 2A020                     | F1D11                   | D-14                           | D-13                          |                      |
| 81 - 2A020                     | F1E13                   | D-15                           | D-16                          |                      |
| 83 - 2A020                     | F1E11                   | D-18                           | D-17                          | T06-7B               |
| 85 - 2A020                     | G1A13                   | D-19                           | D-20                          |                      |
| 87 - 2A020                     | G1A11                   | D-22                           | D-21                          | T06-6C               |
| 89 - 2A020                     | H1A13                   | E-1                            | E-2                           |                      |
| 91 - 2A020                     | H1A11                   | E-4                            | E-3                           | T06-6A               |
| 93 - 2A020                     | H1B13                   | E-5                            | E-6                           |                      |
| 95 - 2A020                     | H1B11                   | E-8                            | E-7                           | T06-6B               |
| 97 - 2A020                     | H1C13                   | F-9                            | F-10                          |                      |
| 99 - 2A020                     | H1C11                   | F-12                           | F-11                          | T06-5C               |
| 101 - 2A020                    | H1D13                   | F-13                           | F-14                          |                      |
| 103 - 2A020                    | H1D11                   | F-16                           | F-15                          | T06-5A               |
| 105 - 2A020                    | H1E13                   | F-17                           | F-18                          |                      |
| 107 - 2A020                    | H1E11                   | F-20                           | F-19                          | T06-5B               |
| 109 - 2A020                    | J1A13                   | F-21                           | F-22                          |                      |
| 111 - 2A020                    | J1A11                   | F-2                            | F-1                           | T06-4C               |
| 113 - 2A020                    | J1C13                   | F-3                            | F-4                           |                      |
| 115 - 2A020                    | J1C11                   | F-6                            | F-5                           | T06-4A               |
| 117 - 2A020                    | J1D13                   | F-7                            | F-8                           |                      |
| 119 - 2A020                    | J1D11                   | F-10                           | F-9                           | T06-4B               |
| 121 - 2A020                    | J1E13                   | F-11                           | F-12                          |                      |
| 123 - 2A020                    | J1E11                   | F-14                           | F-13                          | T06-3C               |
| 125 - 2A020                    | K1A13                   | F-15                           | F-16                          |                      |
| 127 - 2A020                    | K1A11                   | F-18                           | F-17                          | T06-3A               |
| 129 - 2A020                    | K1B13                   | F-19                           | F-20                          |                      |
| 131 - 2A020                    | K1B11                   | F-22                           | F-21                          | T06-3B               |

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|---|--|---------------------------------|------|---------|---------|----------------|-----------|--------------------------|------|----------------|--|
|   |  |                                 | 1000 |         |         |                |           |                          |      |                |  |
| NAME  |  | HRR (0115 MOD POSITIONS MOD IT) |      |         | DATE    |                | CHANGE NO |                          | DATE |                |  |
|   |  |                                 |      |         | 24JAN77 |                | 1495230   |                          |      |                |  |
|   |  |                                 |      |         | 6DEC77  |                | 356703    |                          |      |                |  |
| DESIGN  |  |                                 |      | SHT CF  |         |                |           |                          |      |                |  |
| DETAIL  |  | L.A.I.                          |      | 20JAN77 |         | WD FEB77       |           |                          |      |                |  |
| CHECK   |  | E.B.B.                          |      | 22JAN77 |         | CLASSIFICATION |           | MUST CONFORM TO ENG SPEC |      | DEVELOPMENT NO |  |
| APPRO   |  | R.C.H.                          |      | 9FEB77  |         | Pg 4           |           | 20 MAR 77                |      | LOGIC PG NO    |  |
|   |  |                                 |      |         |         |                |           |                          |      | 2A110          |  |











4703203 C

MOD II

PART NO  
4703203  
LOGIC PG NO  
ZA130

| FEED THRU CARD |     | ECHO CHECK CARD |      |
|----------------|-----|-----------------|------|
| 1              | BO3 | W23             | W23  |
| 2              | BO4 | W24             | W24  |
| 3              | BO5 | W25             | W25  |
| 4              | BO6 | W26             | W26  |
| 5              | BO7 | W27             | W27  |
| 6              | BO8 | W28             | W28  |
| 7              | BO9 | W29             | W29  |
| 8              | BOA | W30             | W30  |
| 9              | BOB | W31             | W31  |
| 10             | BOC | W32             | W32  |
| 11             | BOD | W33             | W33  |
| 12             | BOE | W34             | W34  |
| 13             | BOF | W35             | W35  |
| 14             | BOG | W36             | W36  |
| 15             | BOH | W37             | W37  |
| 16             | BOI | W38             | W38  |
| 17             | BOJ | W39             | W39  |
| 18             | BOK | W40             | W40  |
| 19             | BOA | W41             | W41  |
| 20             | BOB | W42             | W42  |
| 21             | BOC | W43             | W43  |
| 22             | BOD | W44             | W44  |
| 23             | BOE | W45             | W45  |
| 24             | BOF | W46             | W46  |
| 25             | BOG | W47             | W47  |
| 26             | BOH | W48             | W48  |
| 27             | BOI | W49             | W49  |
| 28             | BOJ | W50             | W50  |
| 29             | BOK | W51             | W51  |
| 30             | BOA | W52             | W52  |
| 31             | BOB | W53             | W53  |
| 32             | BOC | W54             | W54  |
| 33             | BOD | W55             | W55  |
| 34             | BOE | W56             | W56  |
| 35             | BOF | W57             | W57  |
| 36             | BOG | W58             | W58  |
| 37             | BOH | W59             | W59  |
| 38             | BOI | W60             | W60  |
| 39             | BOJ | W61             | W61  |
| 40             | BOK | W62             | W62  |
| 41             | BOA | W63             | W63  |
| 42             | BOB | W64             | W64  |
| 43             | BOC | W65             | W65  |
| 44             | BOD | W66             | W66  |
| 45             | BOE | W67             | W67  |
| 46             | BOF | W68             | W68  |
| 47             | BOG | W69             | W69  |
| 48             | BOH | W70             | W70  |
| 49             | BOI | W71             | W71  |
| 50             | BOJ | W72             | W72  |
| 51             | BOK | W73             | W73  |
| 52             | BOA | W74             | W74  |
| 53             | BOB | W75             | W75  |
| 54             | BOC | W76             | W76  |
| 55             | BOD | W77             | W77  |
| 56             | BOE | W78             | W78  |
| 57             | BOF | W79             | W79  |
| 58             | BOG | W80             | W80  |
| 59             | BOH | W81             | W81  |
| 60             | BOI | W82             | W82  |
| 61             | BOJ | W83             | W83  |
| 62             | BOK | W84             | W84  |
| 63             | BOA | W85             | W85  |
| 64             | BOB | W86             | W86  |
| 65             | BOC | W87             | W87  |
| 66             | BOD | W88             | W88  |
| 67             | BOE | W89             | W89  |
| 68             | BOF | W90             | W90  |
| 69             | BOG | W91             | W91  |
| 70             | BOH | W92             | W92  |
| 71             | BOI | W93             | W93  |
| 72             | BOJ | W94             | W94  |
| 73             | BOK | W95             | W95  |
| 74             | BOA | W96             | W96  |
| 75             | BOB | W97             | W97  |
| 76             | BOC | W98             | W98  |
| 77             | BOD | W99             | W99  |
| 78             | BOE | W100            | W100 |
| 79             | BOF | W101            | W101 |
| 80             | BOG | W102            | W102 |
| 81             | BOH | W103            | W103 |
| 82             | BOI | W104            | W104 |
| 83             | BOJ | W105            | W105 |
| 84             | BOK | W106            | W106 |
| 85             | BOA | W107            | W107 |
| 86             | BOB | W108            | W108 |
| 87             | BOC | W109            | W109 |
| 88             | BOD | W110            | W110 |
| 89             | BOE | W111            | W111 |
| 90             | BOF | W112            | W112 |
| 91             | BOG | W113            | W113 |
| 92             | BOH | W114            | W114 |
| 93             | BOI | W115            | W115 |
| 94             | BOJ | W116            | W116 |
| 95             | BOK | W117            | W117 |
| 96             | BOA | W118            | W118 |
| 97             | BOB | W119            | W119 |
| 98             | BOC | W120            | W120 |
| 99             | BOD | W121            | W121 |
| 100            | BOE | W122            | W122 |
| 101            | BOF | W123            | W123 |
| 102            | BOG | W124            | W124 |
| 103            | BOH | W125            | W125 |
| 104            | BOI | W126            | W126 |
| 105            | BOJ | W127            | W127 |
| 106            | BOK | W128            | W128 |
| 107            | BOA | W129            | W129 |
| 108            | BOB | W130            | W130 |
| 109            | BOC | W131            | W131 |
| 110            | BOD | W132            | W132 |
| 111            | BOE | W133            | W133 |
| 112            | BOF | W134            | W134 |
| 113            | BOG | W135            | W135 |
| 114            | BOH | W136            | W136 |
| 115            | BOI | W137            | W137 |
| 116            | BOJ | W138            | W138 |
| 117            | BOK | W139            | W139 |
| 118            | BOA | W140            | W140 |
| 119            | BOB | W141            | W141 |
| 120            | BOC | W142            | W142 |
| 121            | BOD | W143            | W143 |
| 122            | BOE | W144            | W144 |
| 123            | BOF | W145            | W145 |
| 124            | BOG | W146            | W146 |
| 125            | BOH | W147            | W147 |
| 126            | BOI | W148            | W148 |
| 127            | BOJ | W149            | W149 |
| 128            | BOK | W150            | W150 |
| 129            | BOA | W151            | W151 |
| 130            | BOB | W152            | W152 |
| 131            | BOC | W153            | W153 |
| 132            | BOD | W154            | W154 |
| 133            | BOE | W155            | W155 |
| 134            | BOF | W156            | W156 |
| 135            | BOG | W157            | W157 |
| 136            | BOH | W158            | W158 |
| 137            | BOI | W159            | W159 |
| 138            | BOJ | W160            | W160 |
| 139            | BOK | W161            | W161 |
| 140            | BOA | W162            | W162 |
| 141            | BOB | W163            | W163 |
| 142            | BOC | W164            | W164 |
| 143            | BOD | W165            | W165 |
| 144            | BOE | W166            | W166 |
| 145            | BOF | W167            | W167 |
| 146            | BOG | W168            | W168 |
| 147            | BOH | W169            | W169 |
| 148            | BOI | W170            | W170 |
| 149            | BOJ | W171            | W171 |
| 150            | BOK | W172            | W172 |
| 151            | BOA | W173            | W173 |
| 152            | BOB | W174            | W174 |
| 153            | BOC | W175            | W175 |
| 154            | BOD | W176            | W176 |
| 155            | BOE | W177            | W177 |
| 156            | BOF | W178            | W178 |
| 157            | BOG | W179            | W179 |
| 158            | BOH | W180            | W180 |
| 159            | BOI | W181            | W181 |
| 160            | BOJ | W182            | W182 |
| 161            | BOK | W183            | W183 |
| 162            | BOA | W184            | W184 |
| 163            | BOB | W185            | W185 |
| 164            | BOC | W186            | W186 |
| 165            | BOD | W187            | W187 |
| 166            | BOE | W188            | W188 |
| 167            | BOF | W189            | W189 |
| 168            | BOG | W190            | W190 |
| 169            | BOH | W191            | W191 |
| 170            | BOI | W192            | W192 |
| 171            | BOJ | W193            | W193 |
| 172            | BOK | W194            | W194 |
| 173            | BOA | W195            | W195 |
| 174            | BOB | W196            | W196 |
| 175            | BOC | W197            | W197 |
| 176            | BOD | W198            | W198 |
| 177            | BOE | W199            | W199 |
| 178            | BOF | W200            | W200 |
| 179            | BOG | W201            | W201 |
| 180            | BOH | W202            | W202 |
| 181            | BOI | W203            | W203 |
| 182            | BOJ | W204            | W204 |
| 183            | BOK | W205            | W205 |
| 184            | BOA | W206            | W206 |
| 185            | BOB | W207            | W207 |
| 186            | BOC | W208            | W208 |
| 187            | BOD | W209            | W209 |
| 188            | BOE | W210            | W210 |
| 189            | BOF | W211            | W211 |
| 190            | BOG | W212            | W212 |
| 191            | BOH | W213            | W213 |
| 192            | BOI | W214            | W214 |
| 193            | BOJ | W215            | W215 |
| 194            | BOK | W216            | W216 |
| 195            | BOA | W217            | W217 |
| 196            | BOB | W218            | W218 |
| 197            | BOC | W219            | W219 |
| 198            | BOD | W220            | W220 |
| 199            | BOE | W221            | W221 |
| 200            | BOF | W222            | W222 |
| 201            | BOG | W223            | W223 |
| 202            | BOH | W224            | W224 |
| 203            | BOI | W225            | W225 |
| 204            | BOJ | W226            | W226 |
| 205            | BOK | W227            | W227 |
| 206            | BOA | W228            | W228 |
| 207            | BOB | W229            | W229 |
| 208            | BOC | W230            | W230 |
| 209            | BOD | W231            | W231 |
| 210            | BOE | W232            | W232 |
| 211            | BOF | W233            | W233 |
| 212            | BOG | W234            | W234 |
| 213            | BOH | W235            | W235 |
| 214            | BOI | W236            | W236 |
| 215            | BOJ | W237            | W237 |
| 216            | BOK | W238            | W238 |
| 217            | BOA | W239            | W239 |
| 218            | BOB | W240            | W240 |
| 219            | BOC | W241            | W241 |
| 220            | BOD | W242            | W242 |
| 221            | BOE | W243            | W243 |
| 222            | BOF | W244            | W244 |
| 223            | BOG | W245            | W245 |
| 224            | BOH | W246            | W246 |
| 225            | BOI | W247            | W247 |
| 226            | BOJ | W248            | W248 |
| 227            | BOK | W249            | W249 |
| 228            | BOA | W250            | W250 |
| 229            | BOB | W251            | W251 |
| 230            | BOC | W252            | W252 |
| 231            | BOD | W253            | W253 |
| 232            | BOE | W254            | W254 |
| 233            | BOF | W255            | W255 |
| 234            | BOG | W256            | W256 |
| 235            | BOH | W257            | W257 |
| 236            | BOI | W258            | W258 |
| 237            | BOJ | W259            | W259 |
| 238            | BOK | W260            | W260 |
| 239            | BOA | W261            | W261 |
| 240            | BOB | W262            | W262 |
| 241            | BOC | W263            | W263 |
| 242            | BOD | W264            | W264 |
| 243            | BOE | W265            | W265 |
| 244            | BOF | W266            | W266 |
| 245            | BOG | W267            | W267 |
| 246            | BOH | W268            | W268 |
| 247            | BOI | W269            | W269 |
| 248            | BOJ | W270            | W270 |
| 249            | BOK | W271            | W271 |
| 250            | BOA | W272            | W272 |
| 251            | BOB | W273            | W273 |
| 252            | BOC | W274            | W274 |
| 253            | BOD | W275            | W275 |
| 254            | BOE | W276            | W276 |
| 255            | BOF | W277            | W277 |
| 256            | BOG | W278            | W278 |
| 257            | BOH | W279            | W279 |
| 258            | BOI | W280            | W280 |
| 259            | BOJ | W281            | W281 |
| 260            | BOK | W282            | W282 |
| 261            | BOA | W283            | W283 |
| 262            | BOB | W284            | W284 |
| 263            | BOC | W285            | W285 |
| 264            | BOD | W286            | W286 |
| 265            | BOE | W287            | W287 |
| 266            | BOF | W288            | W288 |
| 267            | BOG | W289            | W289 |
| 268            | BOH | W290            | W290 |
| 269            | BOI | W291            | W291 |
| 270            | BOJ | W292            | W292 |
| 271            | BOK | W293            | W293 |
| 272            | BOA | W294            | W294 |
| 273            | BOB | W295            | W295 |
| 274            | BOC | W296            | W296 |
| 275            | BOD | W297            | W297 |
| 276            | BOE | W298            | W298 |
| 277            | BOF | W299            | W299 |
| 278            | BOG | W300            | W300 |
| 279            | BOH | W301            | W301 |
| 280            | BOI | W302            | W302 |
| 281            | BOJ | W303            | W303 |
| 282            | BOK | W304            | W304 |
| 283            | BOA | W305            | W305 |
| 284            | BOB | W306            | W306 |
| 285            | BOC | W307            | W307 |
| 286            | BOD | W308            | W308 |
| 287            | BOE | W309            | W309 |
| 288            | BOF | W310            | W310 |
| 289            | BOG | W311            | W311 |
| 290            | BOH | W312            | W312 |
| 291            | BOI | W313            | W313 |
| 292            | BOJ | W314            | W314 |
| 293            | BOK | W315            | W315 |
| 294            | BOA | W316            | W316 |
| 295            | BOB | W317            | W317 |
| 296            | BOC | W318            | W318 |
| 297            | BOD | W319            | W319 |
| 298            | BOE | W320            | W320 |
| 299            | BOF | W321            | W321 |
| 300            | BOG | W322            | W322 |
| 301            | BOH | W323            | W323 |
| 302            | BOI | W324            | W324 |
| 303            | BOJ | W325            | W325 |
| 304            | BOK | W326            | W326 |
| 305            | BOA | W327            | W327 |
| 306            | BOB | W328            | W328 |
| 307            | BOC | W329            | W329 |
| 308            | BOD | W330            | W330 |
| 309            | BOE | W331            | W331 |
| 310            | BOF | W332            | W332 |
| 311            | BOG | W333            | W333 |
| 312            | BOH | W334            | W334 |
| 313            | BOI | W335            | W335 |
| 314            | BOJ | W336            | W336 |
| 315            | BOK | W337            | W337 |
| 316            | BOA | W338            | W338 |
| 317            | BOB | W339            | W339 |
| 318            | BOC | W340            | W340 |
| 319            | BOD | W341            | W341 |
| 320            | BOE | W342            | W342 |
| 321            | BOF | W343            | W343 |
| 322            | BOG | W344            | W344 |
| 323            | BOH | W345            | W345 |
| 324            | BOI | W346            | W346 |
| 325            | BOJ | W347            | W347 |
| 326            | BOK | W348            | W348 |
| 327            | BOA | W349            | W349 |
| 328            | BOB | W350            | W350 |
| 329            | BOC | W351            | W351 |
| 330            | BOD | W352            | W352 |
| 331            | BOE | W353            | W353 |
| 332            | BOF | W354            | W354 |
| 333            | BOG | W355            | W355 |
| 334            | BOH | W356            | W356 |
| 335            | BOI | W357            | W357 |
| 336            | BOJ | W358            | W358 |









C

4703230

4703230

ZZ011

5211 MOD I - II

| COMPONENT   | PART NUMBER | DESCRIPTION     | FUNCTION                           | LOGIC PAGE         |
|---|-------------|-----------------|------------------------------------|--------------------|
| R1, R2, R3, R4  | 639292      | 100Ω 10W        | RIGHT, LEFT RIBBON MOTOR           | ZA070-ZA071        |
| R5, R6  | 5615879     | 4Ω 50W          | BELT MOTOR                         | ZA071              |
| R7, R8, R9, R10   | 5615309     | 7Ω 50W          | RIGHT, LEFT RIBBON MOTOR           | ZA070-ZA071        |
| R11, R12  | 5615311     | 15Ω 50W         | CARRIAGE MOTOR                     | ZA070              |
| R13   | 507142      | 100Ω 25W        | +25V NOISE SUPPRESSION             | ZZ020              |
| R14, R15  | 5615309     | 7Ω 50W          | CARRIAGE MOTOR                     | ZA070              |
| R16   | 5615592     | 20Ω 50W         | LOWER PAPER CLAMP                  | ZA081              |
| R20   | 216465      | 7.5K 1/4W       | BELT EMITTER NOISE SUPPRESSION     | ZA080              |
| R21   | 1810970     | 25K             | IMPRESSION CONTROL POT             | ZA080              |
| SW1   | 363420      | SWITCH          | POWER ON/OFF                       | YF001              |
| SW2   | 1589401     | SWITCH          | END OF FORMS                       | ZA080              |
| SW3   | 5616034     | SWITCH          | THROAT INTLK                       | ZA080              |
| SW4, SW5  | 5576617     | SWITCH          | RIGHT, LEFT RIBBON REV             | ZA070-ZA071        |
| SW6   | 738826      | SWITCH          | 6/8 L.P.I.                         | ZA002              |
| SW C.E.   | 738827      | SWITCH          | CE BELT, CARR, RIBBON, PAPER CLAMP | ZA003              |
| SW7   | 5593438     | SWITCH ASSEMBLY | OPERATOR PANEL                     | ZA002              |
| T81   |             | 20 POS          | DC POWER (LOGIC GATE)              | ZZ020              |
| T82, T83  |             | 8 POS           | RIBBON MOTOR (POWER PLATE)         | ZA070-ZA071, ZZ020 |
| T84   |             | 8 POS           | BELT EMITTER (BELT LED)            | ZA082              |
| T85   |             | 8 POS           | CARRIAGE EMITTER (CARR LED)        | ZA082              |
| T86   |             | 29 POS          | HAMMER RETURN (REAR OF HMR UNIT)   | ZA100              |
|   | 5593440     | PCB-OP          | LED COMPONENT BOARD OPERATOR PANEL | ZA002              |
| 50/60 HZ POWER SUPPLY ASSEMBLY - LEVEL III  |             |                 |                                    |                    |
| PART NUMBER 5593470 DESCRIPTION POWER SUPPLY ASM 50/60 HZ   |             |                 |                                    |                    |
| NOTE: SEE WIRING DIAGRAM PART NUMBER 5593471 FOR COMPLETE LISTING OF POWER SUPPLY COMPONENT PART NUMBERS. |             |                 |                                    |                    |
|   | 1862655     | FILTER          | AC LINE FILTER                     | YF001              |
| (P5)P1  |             | 4 POS CONN      | AC POWER TO FERRIS TRANSFORMER     | YF001              |
| (P5)P4  |             | 3 POS CONN      | AC POWER TO LOGIC GATE FAN         | YF001              |
| (P5)P20   |             | 15 POS CONN     | AC POWER FERRIS TO CONTROL BOARD   | YF001              |
| (P5)P23   |             | 12 POS CONN     | +25V DC OUTPUT                     | YF001              |
| (P5)P25   |             | 6 POS CONN      | +5V DC AND +8.5VDC OUTPUT          | YF001              |
| (P5)P26   |             | 3 POS CONN      | +24VDC TO CONTROL BOARD            | YF001              |
| (P5)P27   |             | 10 POS CONN     | P.S. SIGNAL                        | YF001              |

| COMPONENT LISTING |           |           |          |             |
|-------------------|-----------|-----------|----------|-------------|
| NAME              | DATE      | CHANGE NO | DATE     | CHANGE NO   |
|                   | 27JUN77   | 359424    |          |             |
|                   | 6DEC77    | 356703    |          |             |
|                   | 17 JAN 78 | 1559694   |          |             |
| DETAIL            | GDB       | 2MAY77    | VD MAY77 |             |
| CHECK             | LAI       | 6MAY77    |          | LOGIC PG NO |
| APPRO             | RCH       | 6MAY77    | RCH      | ZZ011       |









4703206

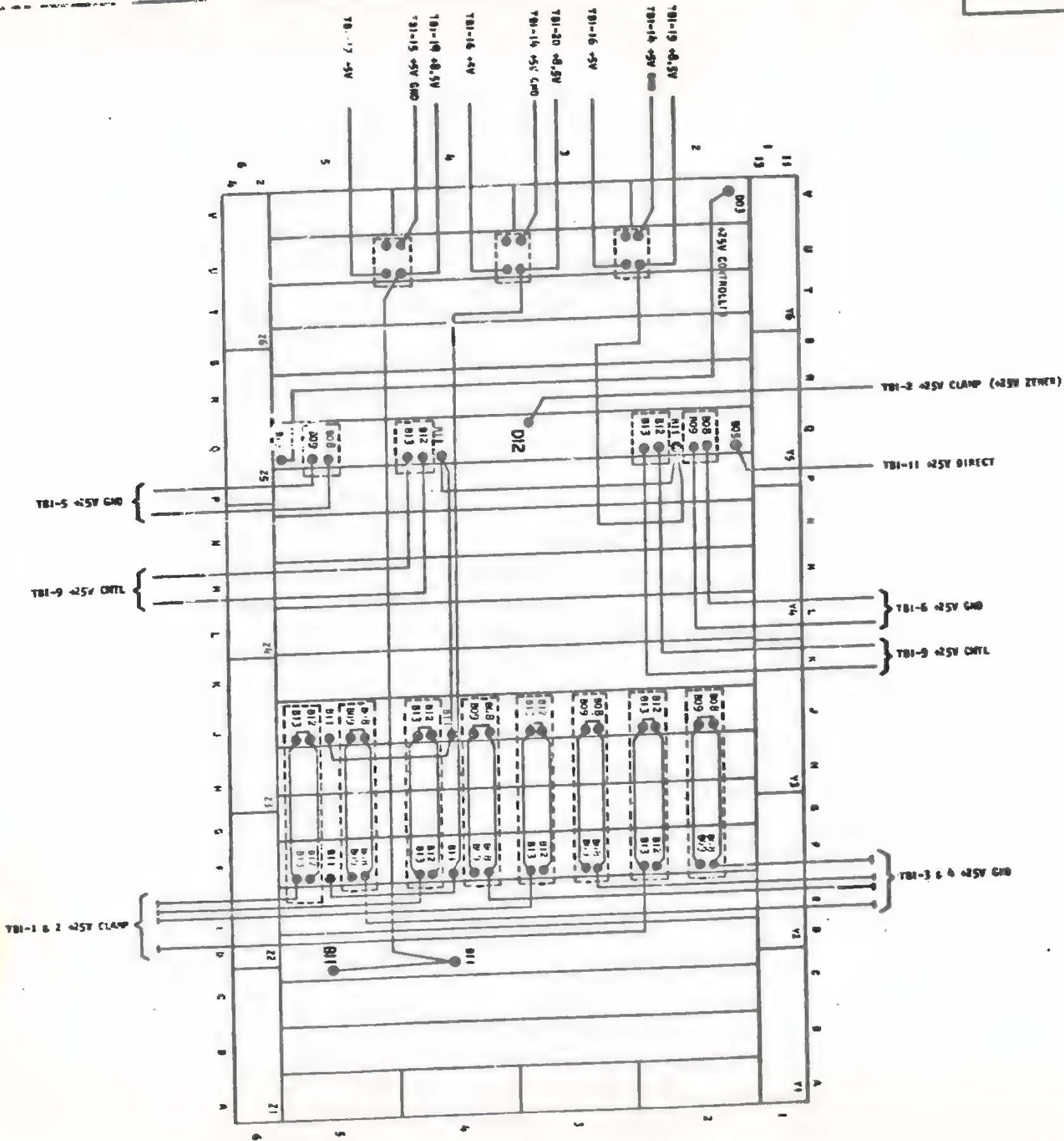
C

PART NO.

4703206

1 (PART NO. AND)

77021



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IBM

NAME DATE VOLTAGE DISTRIBUTION

DESIGN DATE VOLTAGE DISTRIBUTION

DETAIL DATE VOLTAGE DISTRIBUTION

CHECK DATE VOLTAGE DISTRIBUTION

DATE

CHANGE NO

DATE

CHANGE NO

MUST CONFORM TO THE SPECIFICATIONS

DEVELOPMENT NO

LOGIC PG NO

4703206



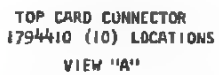


C

27025



TOP CARD CONNECTOR  
1794410 (10) LOCATIONS  
VIEW "A"



NOTES

1. SOME PRINTERS HAVE PART NUMBER 4701110 INSTALLED. IF REPLACEMENT IS NECESSARY ORDER PART NUMBER 4701114.
2. PRINTERS WITH PART NUMBER 8528944 INSTALLED, ORDER PART NUMBER 8564024 FOR REPLACEMENT. IF D2 DIODE IS INSTALLED AND +H.5V IS WIRE TO Q2811 AND Q1811. REF. LOGICS 22020 AND 22021.

4703208 C





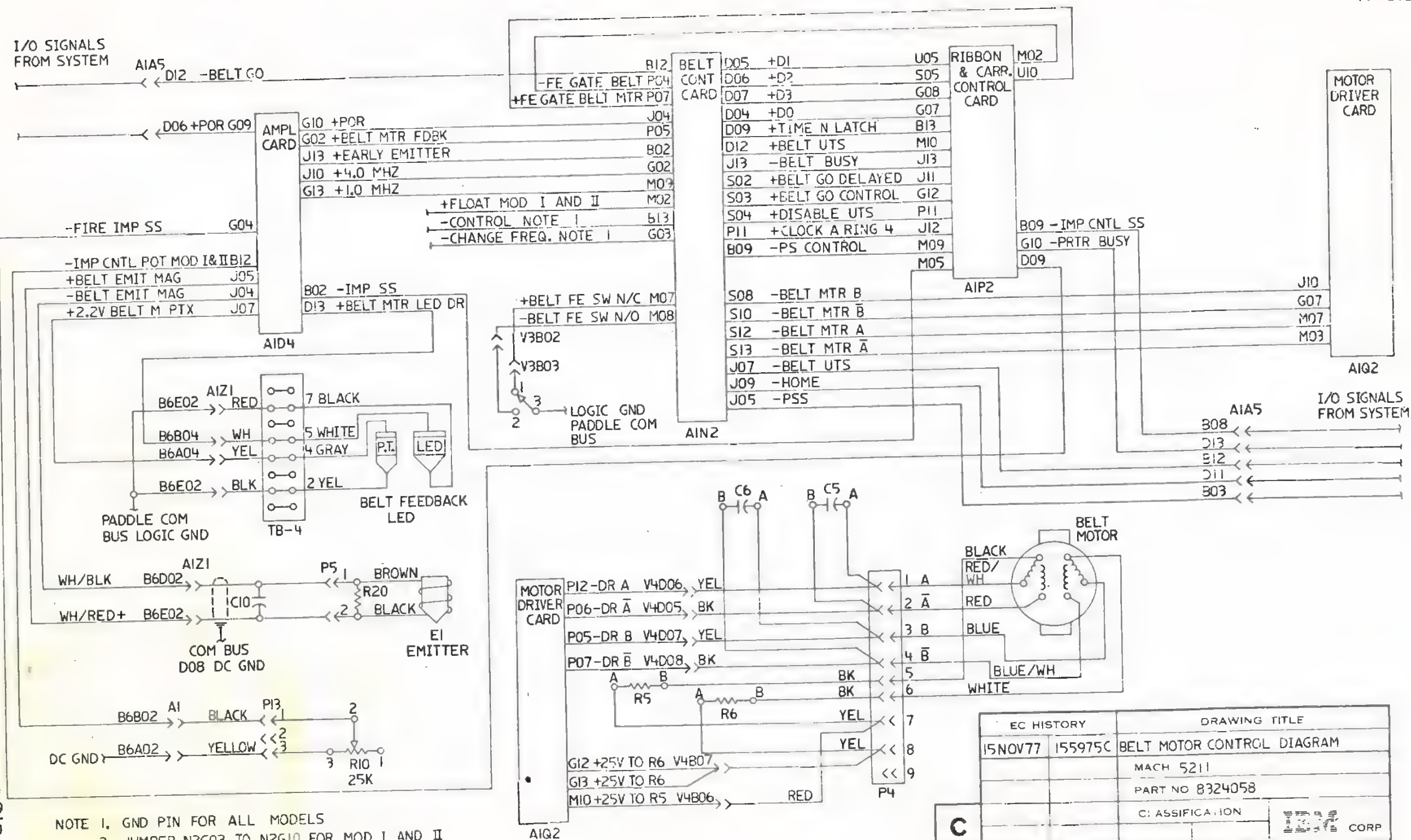
SECTION 19: FUNCTION WIRING AND TIMING DIAGRAMS

SECTION CONTENTS

•This section contains the following 5211 Printer Function Wiring and Timing Diagrams:

| <u>PAGE</u> | <u>PART NUMBER</u> | <u>TITLE</u>                          |
|-------------|--------------------|---------------------------------------|
| 19-010      | 8324058            | Belt Motor Control Diagram            |
| 19-015      | 8324059            | Belt Motor Control Timing             |
| 19-020      | 8324060            | Print Subscan (PSS) Timing            |
| 19-025      | 8324061            | Belt Motor Control Logic              |
| 19-030      | 8324062            | Carriage Motor Control Diagram        |
| 19-035      | 8324063            | Carriage Motor Control Timing (6/LPI) |
| 19-040      | 8324064            | Carriage Motor Control Logic          |
| 19-045      | 8324065            | Carriage Motor Stop Logic             |
| 19-050      | 8324066            | Ribbon Motor Control Diagram          |
| 19-055      | 8324067            | Ribbon Motor Control Timing           |
| 19-060      | 8324068            | Ribbon Motor Control Logic            |
| 19-065      | 8324069            | Hammer Control Diagram (Model--1)     |
| 19-070      | 8324070            | Hammer Control Diagram (Model--2)     |
| 19-075      | 8324071            | Hammer Control Timing                 |
| 19-080      | 8324072            | Hammer Control Logic                  |

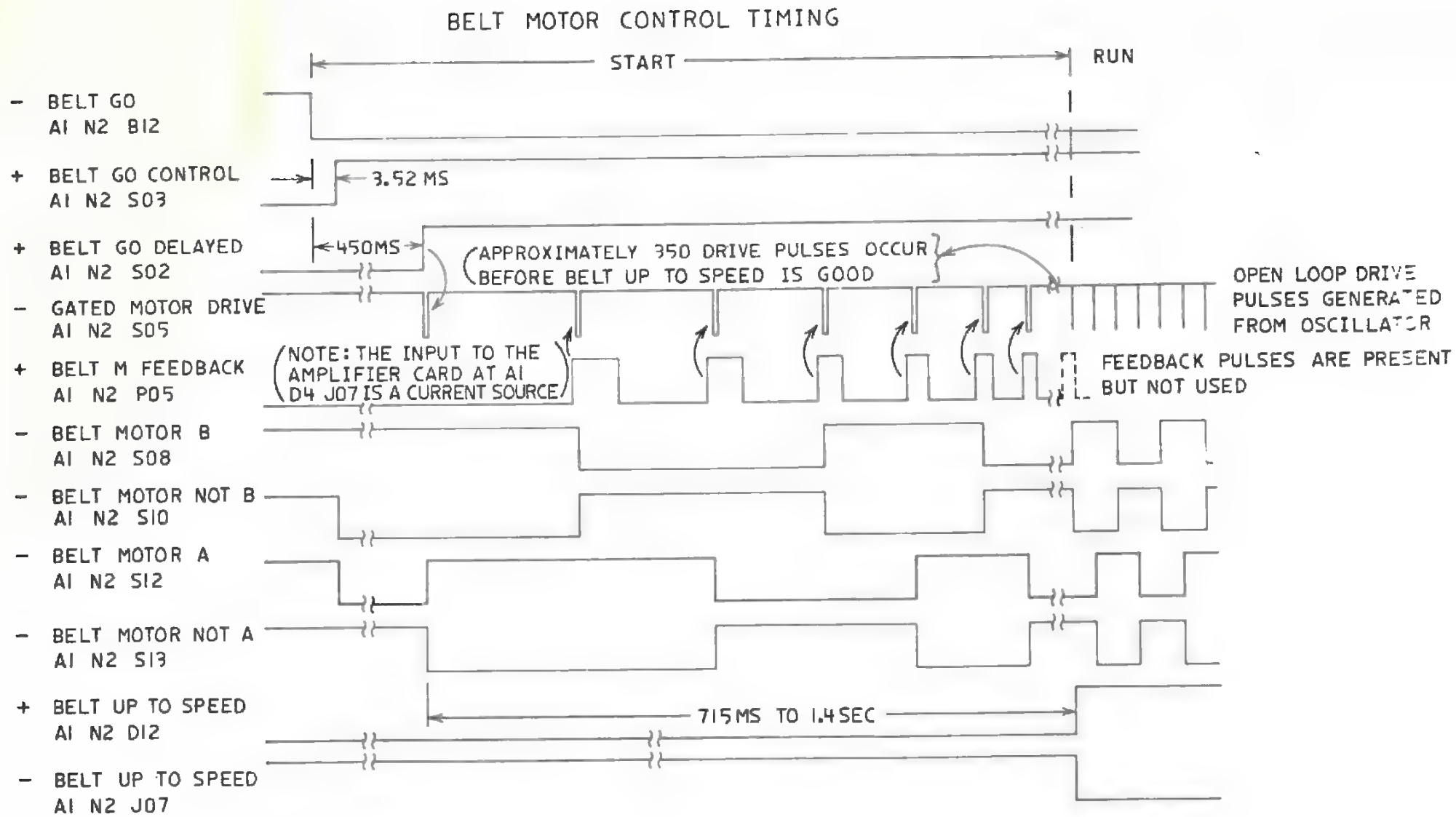
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I/O SIGNALS  
FROM SYSTEM

19-010

19-010



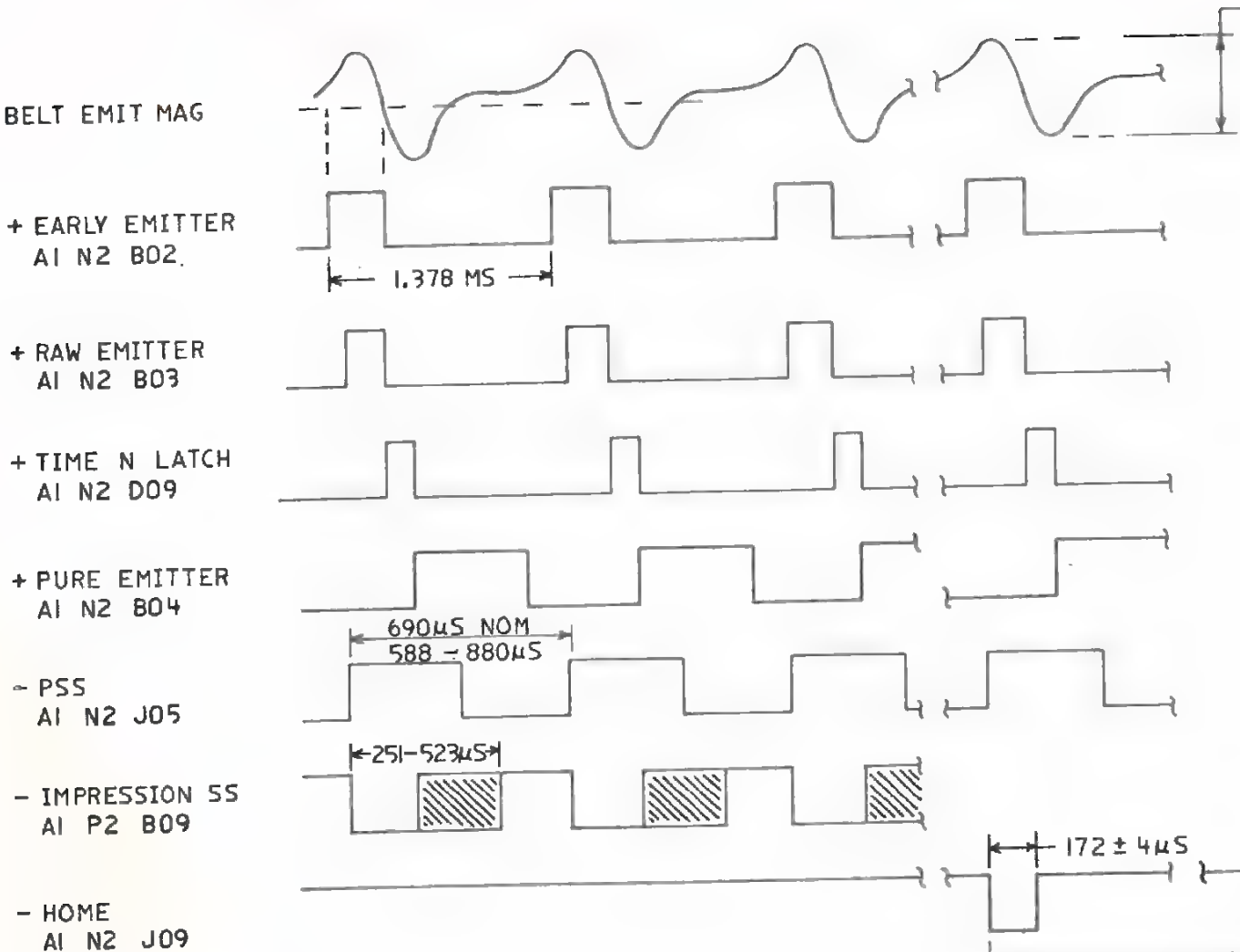


| EC HISTORY |         | DRAWING TITLE             |          |
|------------|---------|---------------------------|----------|
| 15NOV77    | 155975C | BELT MOTOR CONTROL TIMING |          |
|            |         | MACH                      | 5211     |
|            |         | PART NO                   | 8234059  |
| C          |         | CLASSIFICATION            | IBM CORP |
|            |         |                           |          |

19-015

19-015

PRINT SUBSCAN (PSS) TIMING



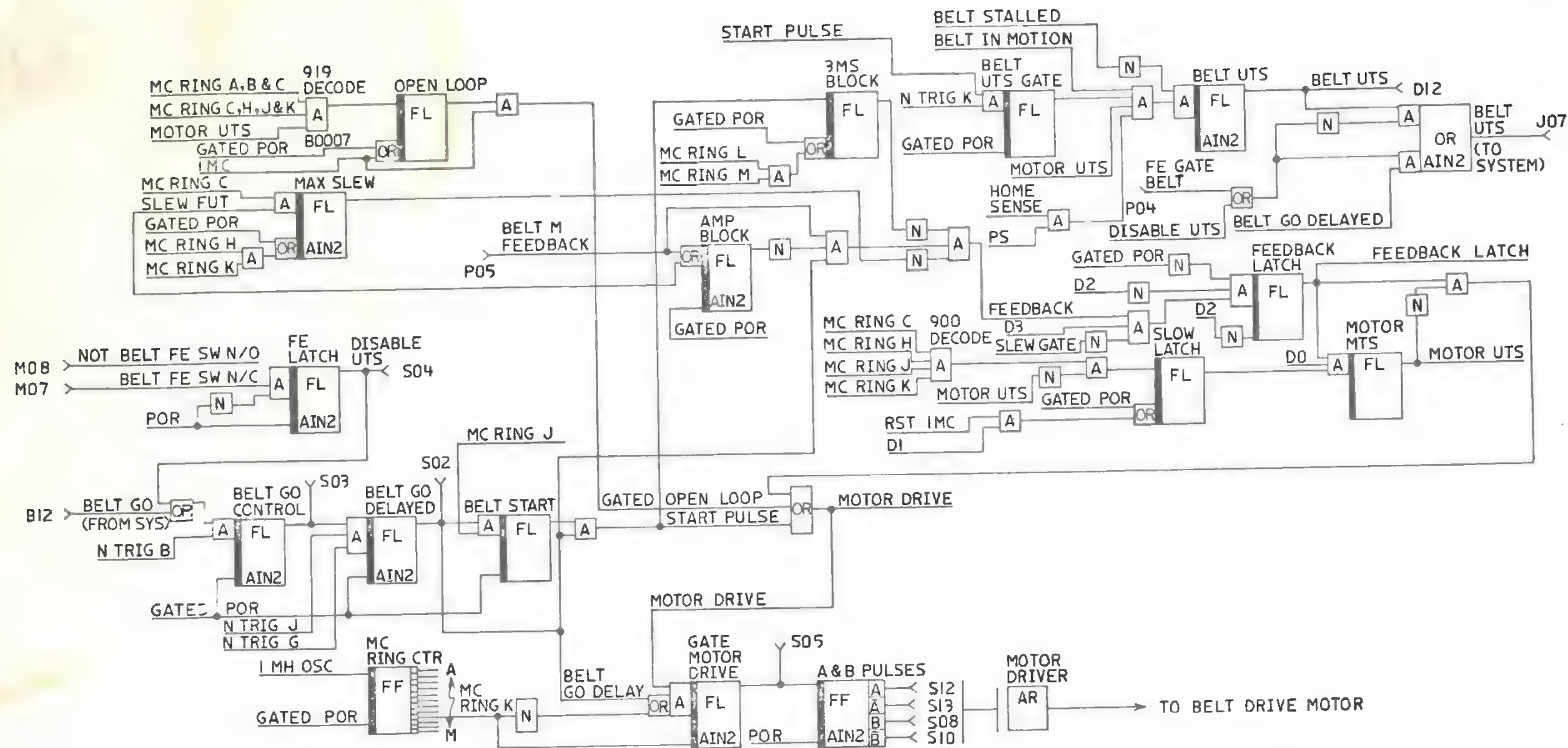
1300 MV (PEAK TO PEAK)  
AT 72.5 IN/SEC BELT SPEED.  
TO OBSERVE THIS WAVE FORM,  
A DIFFERENTIAL INPUT  
OSCILLOSCOPE MUST BE USED.  
CONNECT POSITIVE INPUT  
TO AID4J05 AND NEGATIVE  
INPUT TO AID4J04. DO NOT  
GROUND EITHER LEAD.

TIME (STANDARD CHARACTER SETS)  
165 MS (48 CHARACTER SET)  
220 MS (64 CHARACTER SET)  
331 MS (96 CHARACTER SET)

| EC HISTORY |         | DRAWING TITLE              |          |
|------------|---------|----------------------------|----------|
| 15NOV77    | 155975C | PRINT SUBSCAN (PSS) TIMING |          |
|            |         | MACH 5211                  |          |
|            |         | PART NO 8324060            |          |
| C          |         | CLASSIFICATION             | IBM CORP |
|            |         |                            |          |

19-020

19-020



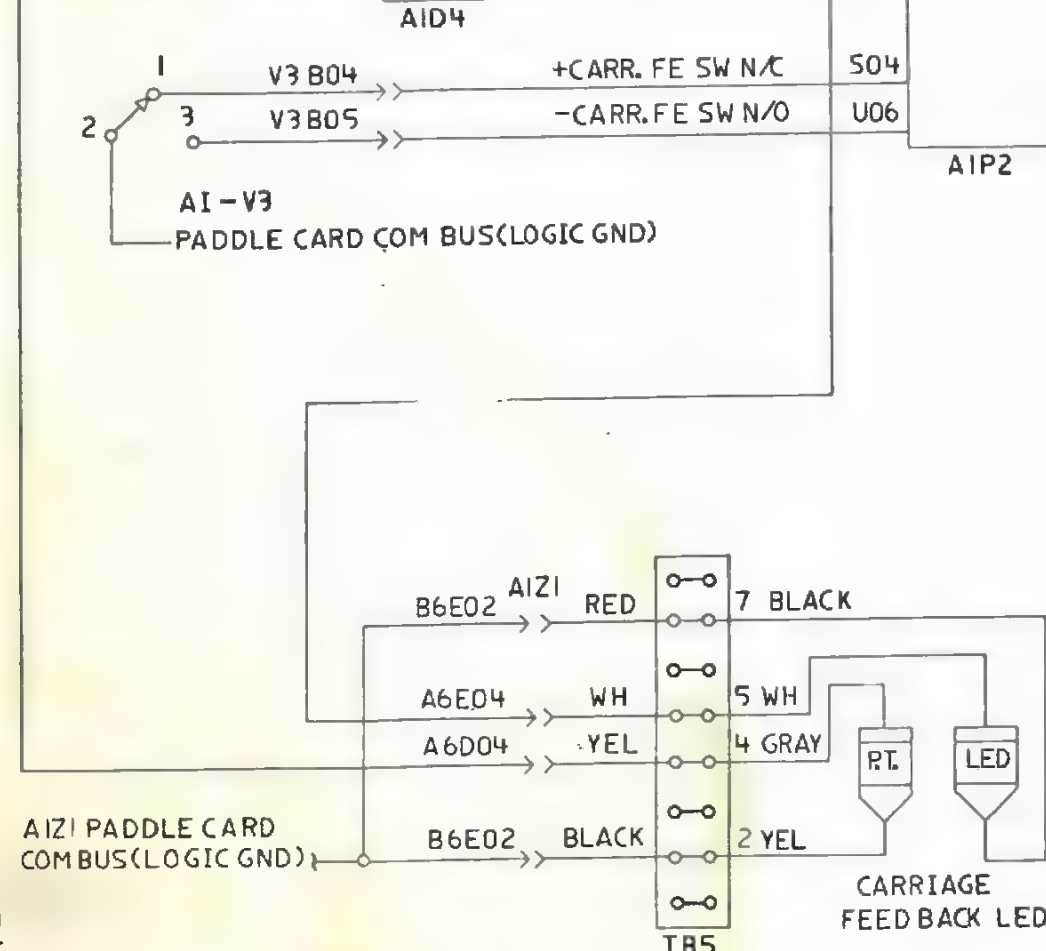
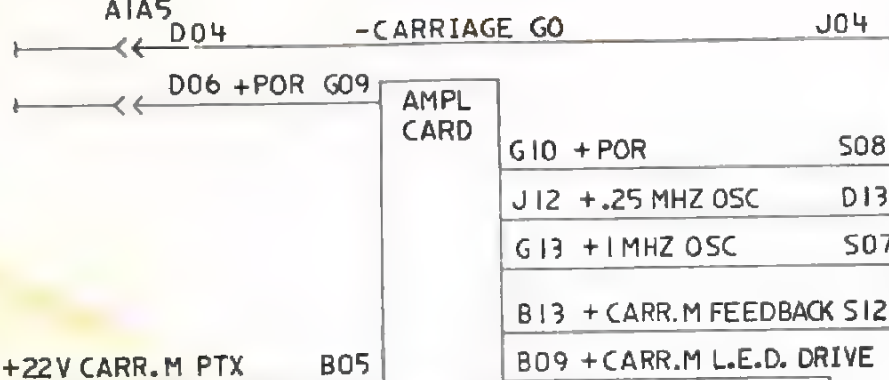
### NOTE

1. THIS DIAGRAM IS NOT A. PRECISE REPRESENTATION OF  
ACTUAL LOGICS, BUT IS PRESENTED FOR EASE OF  
UNDERSTANDING OF LOGIC FLOW

|   |            |         |                          |          |
|---|------------|---------|--------------------------|----------|
| C | EC HISTORY |         | DRAWING TITLE            |          |
|   | 15NOV77    | 155975C | BELT MOTOR CONTROL LOGIC |          |
|   |            |         | MACH 5211                |          |
|   |            |         | PART NO 8324061          |          |
|   |            |         | CLASSIFICATION           |          |
|   |            |         |                          | IBM CORP |

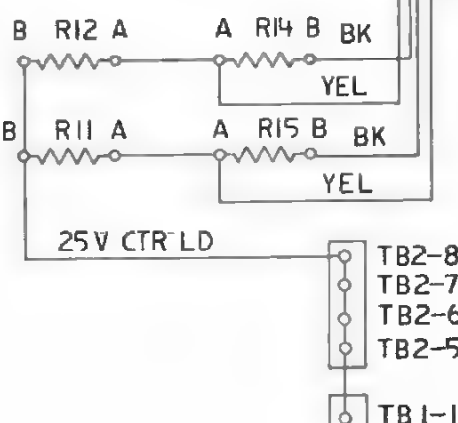
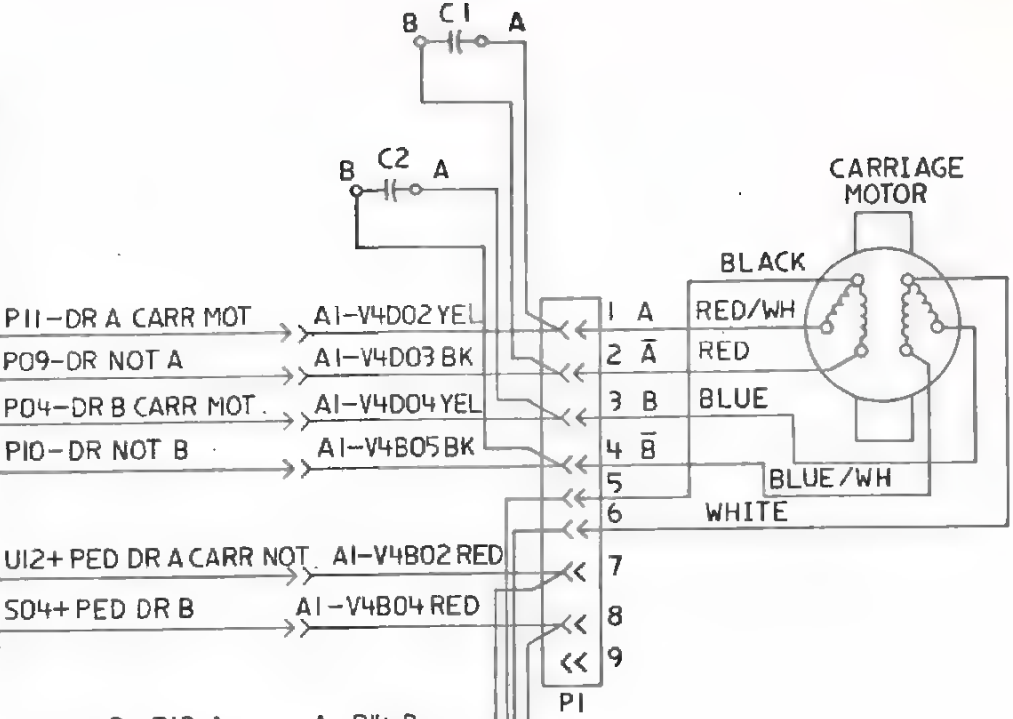
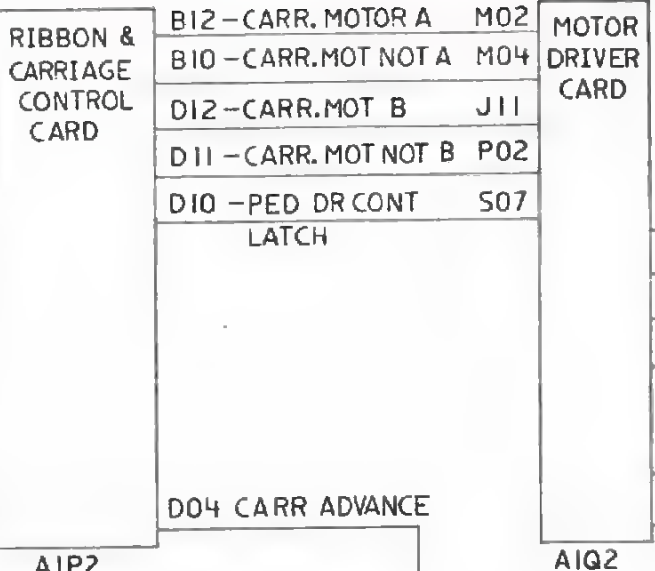


I/O SIGNALS FROM SYSTEM



AIZ1 PADDLE CARD COM BUS (LOGIC GND)

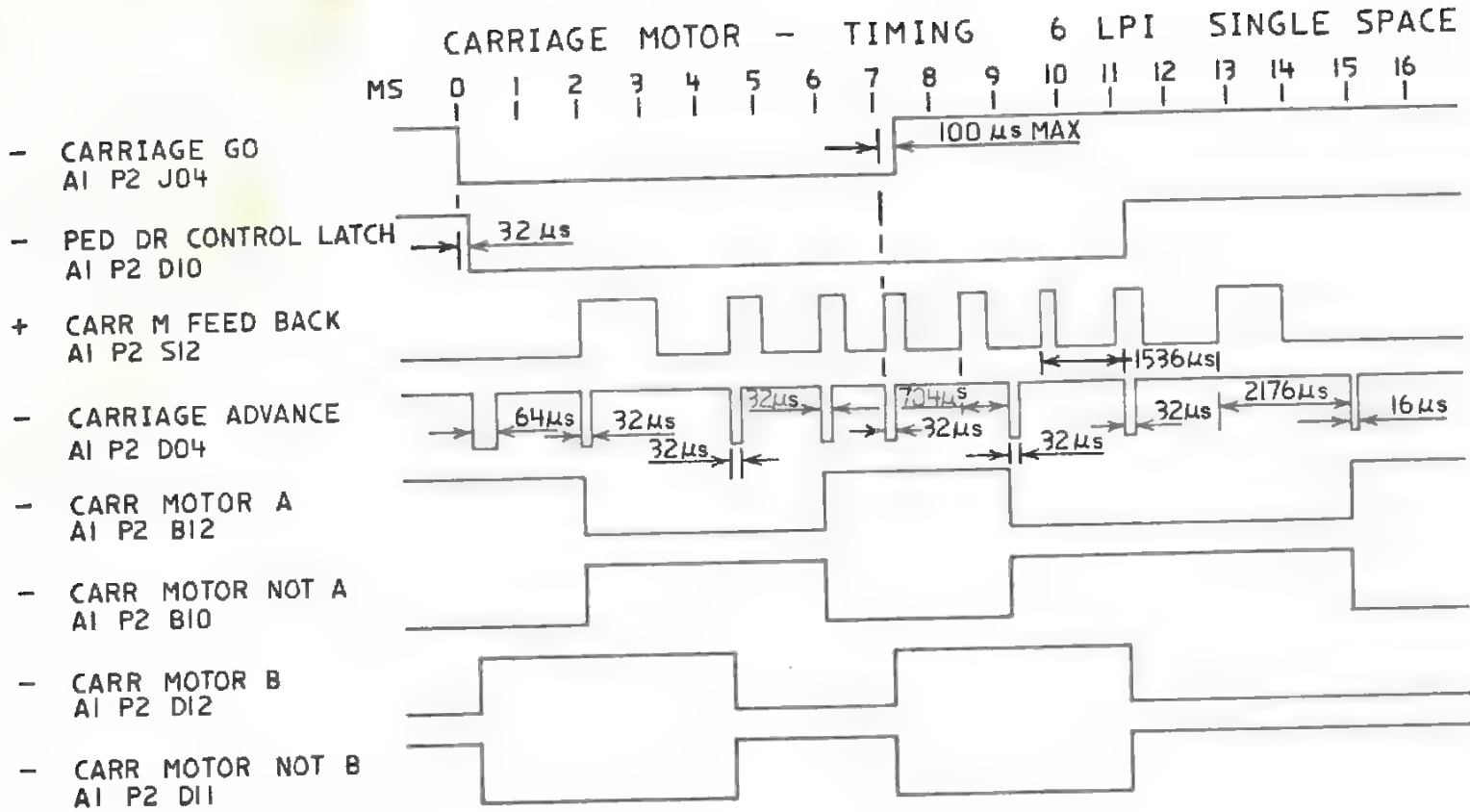
19030



AIA5 B07 I/O SIGNAL TO SYSTEM

| EC HISTORY |         | DRAWING TITLE              |          |
|------------|---------|----------------------------|----------|
| 15 NOV 77  | 155975C | CARR MOTOR CONTROL DIAGRAM |          |
|            |         | MACH 5211                  |          |
|            |         | PART NO 8324062            |          |
| C          |         | CLASSIFICATION             | IBM CORP |
|            |         |                            |          |

19030



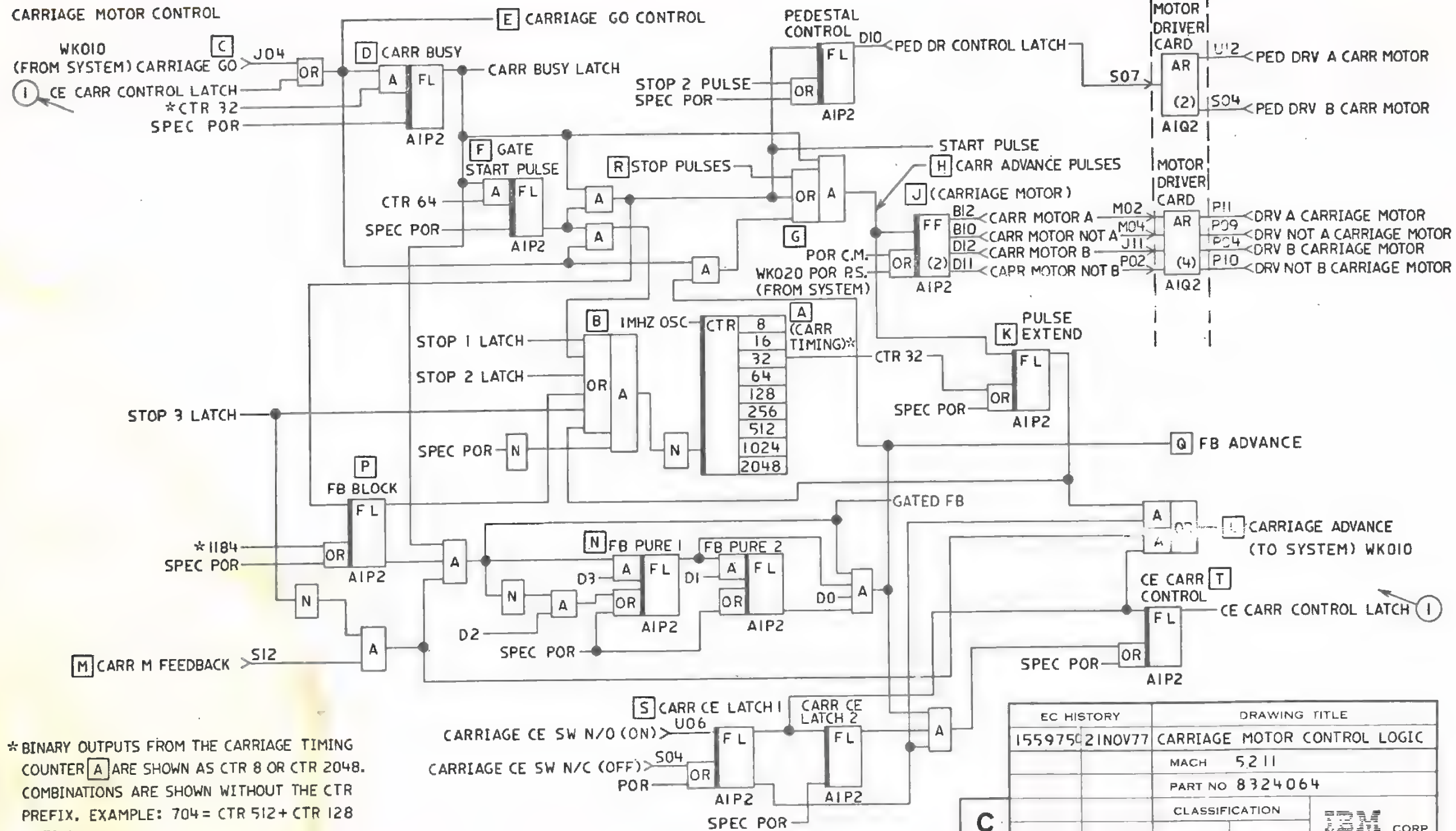
NOTE: CARR MOTOR A, NOT A,  
B, NOT B, MAYBE 180°  
FROM AS SHOWN

| EC HISTORY |         | DRAWING TITLE                 |          |
|------------|---------|-------------------------------|----------|
| 15NOV77    | 155975C | CARRIAGE MOTOR CONTROL TIMING |          |
|            |         | MACH 5211                     |          |
|            |         | PART NO 8324063               |          |
| C          |         | CLASSIFICATION                | IBM CORP |
|            |         |                               |          |

19035

19035

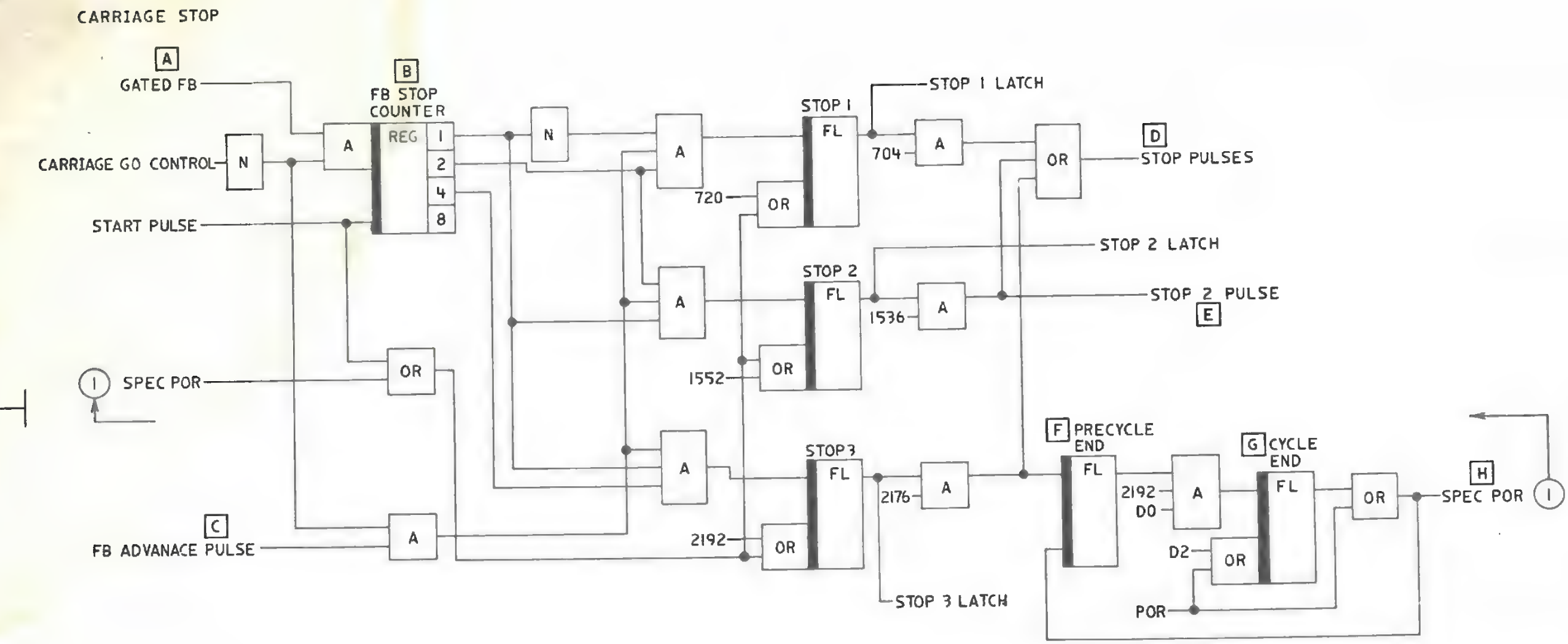
CARRIAGE MOTOR CONTROL



\*BINARY OUTPUTS FROM THE CARRIAGE TIMING COUNTER [A] ARE SHOWN AS CTR 8 OR CTR 2048. COMBINATIONS ARE SHOWN WITHOUT THE CTR PREFIX. EXAMPLE: 704 = CTR 512 + CTR 128 + CTR 64

| EC HISTORY |         | DRAWING TITLE                |          |
|------------|---------|------------------------------|----------|
| 1559750    | 21NOV77 | CARRIAGE MOTOR CONTROL LOGIC |          |
|            |         | MACH                         | 5211     |
|            |         | PART NO 8324064              |          |
| C          |         | CLASSIFICATION               | IBM CORP |
|            |         |                              |          |

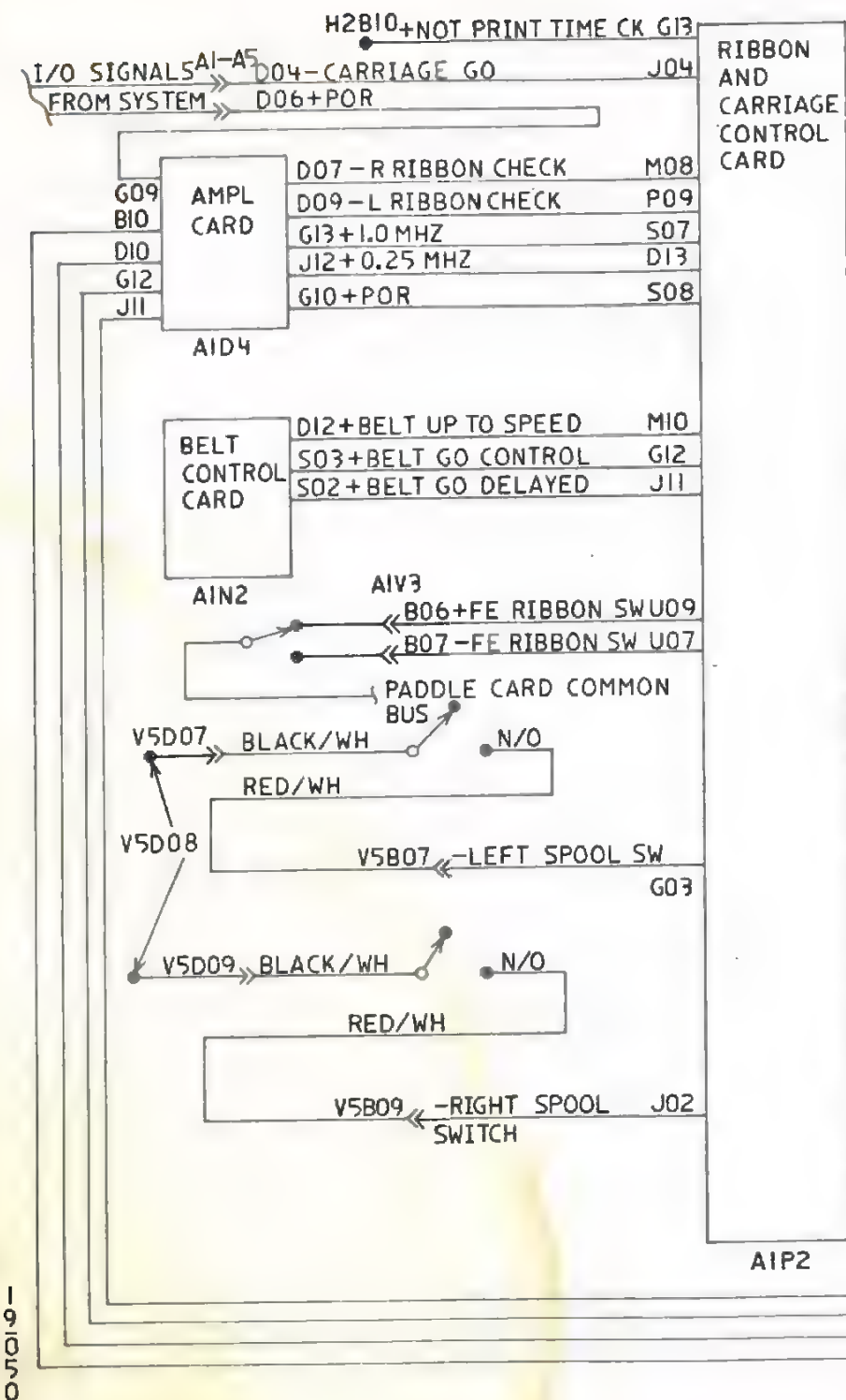




| EC HISTORY |         | DRAWING TITLE             |          |
|------------|---------|---------------------------|----------|
| 155975     | 21NOV77 | CARRIAGE MOTOR STOP LOGIC |          |
|            |         | MACH 5211                 |          |
|            |         | PART NO 8324065           |          |
| C          |         | CLASSIFICATION            | IBM CORP |
|            |         |                           |          |

161075

161075



D05-RIBBON A LEFT D05

D06-RIBBON NOT A LEFT B07

B05-RIBBON B LEFT D06

B07-RIBBON NOT B LEFT G02

J10-LEFT RIB MOTOR PED DR U07

D10-PED DR CONTROL LATCH S07

J07-RIBBON NOT A RIGHT B04

G05-RIBBON A RIGHT D04

D07-RIBBON B RIGHT D11

B08-RIBBON NOT B RIGHT D12

J09-RIGHT RIB MOTOR PED DR U06

G09-RIBBON CHECK AI-A5 B09

G10-PRINTER BUSY AI-A5 D13

I/O SIGNALS TO SYSTEM

MOTOR DRIVER CARD

D07-DRV A LEFT MOTOR

J02-DRV NOT A LEFT MOTOR

D13-DRV B LEFT MOTOR

J06-DRV NOT B LEFT MOTOR

U04+PED DRV A LEFT MOTOR

U05+PED DRV B LEFT MOTOR

D09-DRV NOT A RIGHT MOTOR

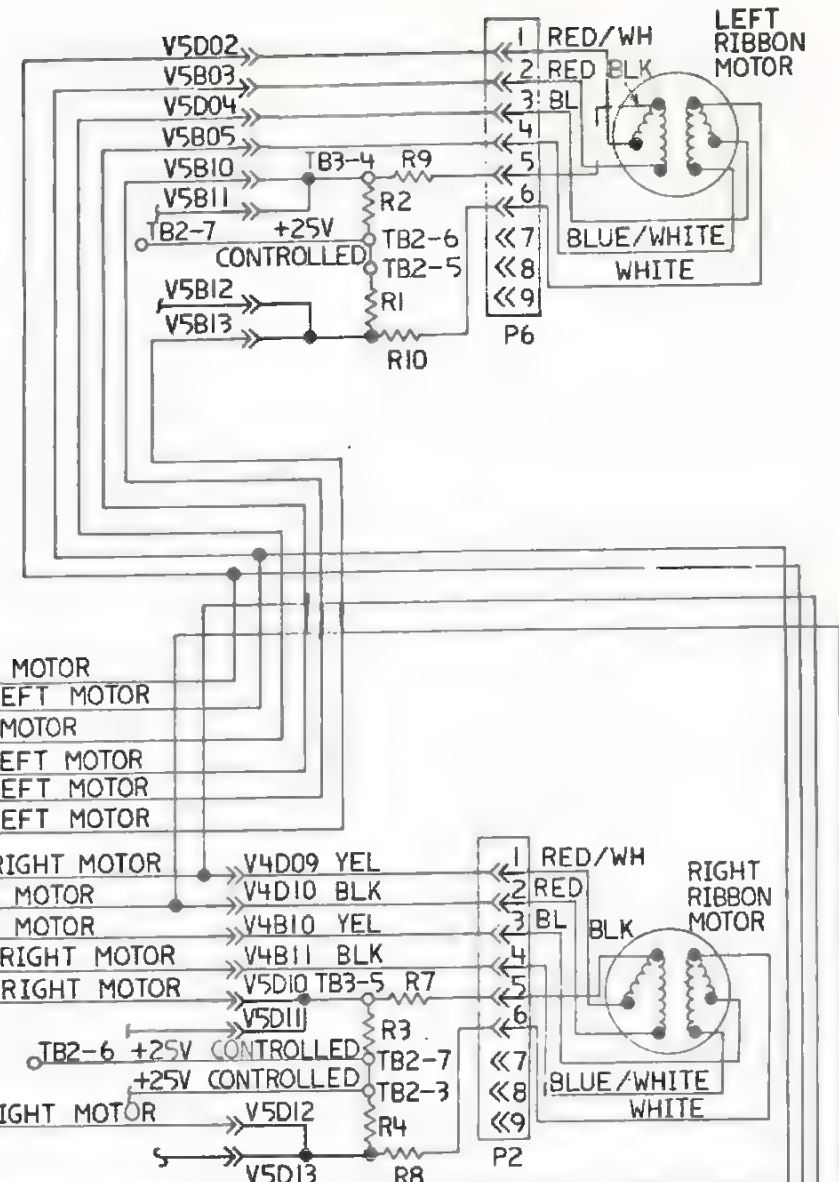
D10-DRV A RIGHT MOTOR

J04-DRV B RIGHT MOTOR

J05-DRV NOT B RIGHT MOTOR

S02+PED DRV A RIGHT MOTOR

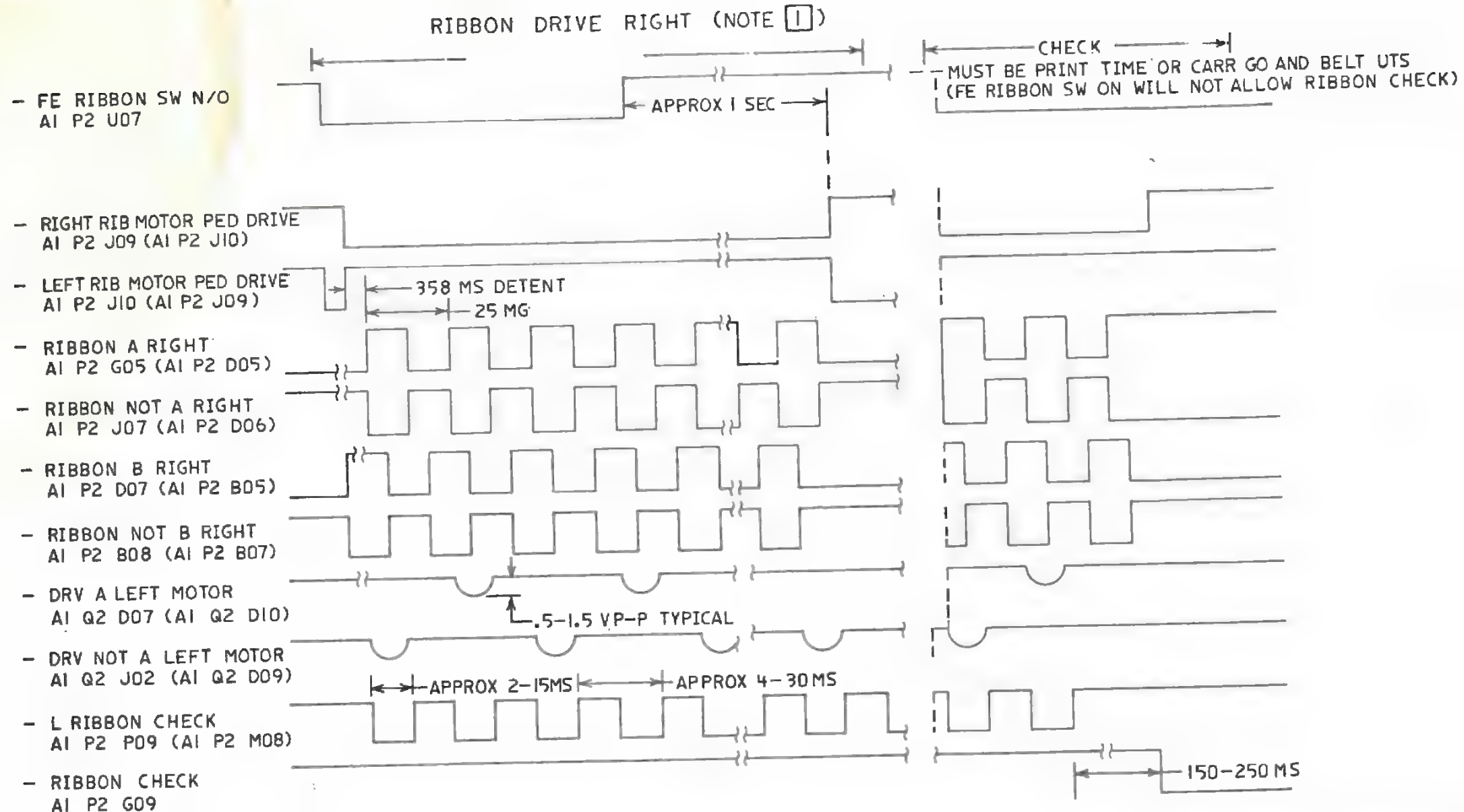
U02+PED DRV B RIGHT MOTOR



| EC HISTORY |         | DRAWING TITLE                |          |
|------------|---------|------------------------------|----------|
| 15NOV77    | 155975C | RIBBON MOTOR CONTROL DIAGRAM |          |
|            |         | MACH 5211                    |          |
|            |         | PART NO 8324066              |          |
|            |         | CLASSIFICATION               | IBM CORP |

1A 21NOV77

GRAPHIC ENGINEERING CORPORATION Buffalo, New York Printed in U.S.A.



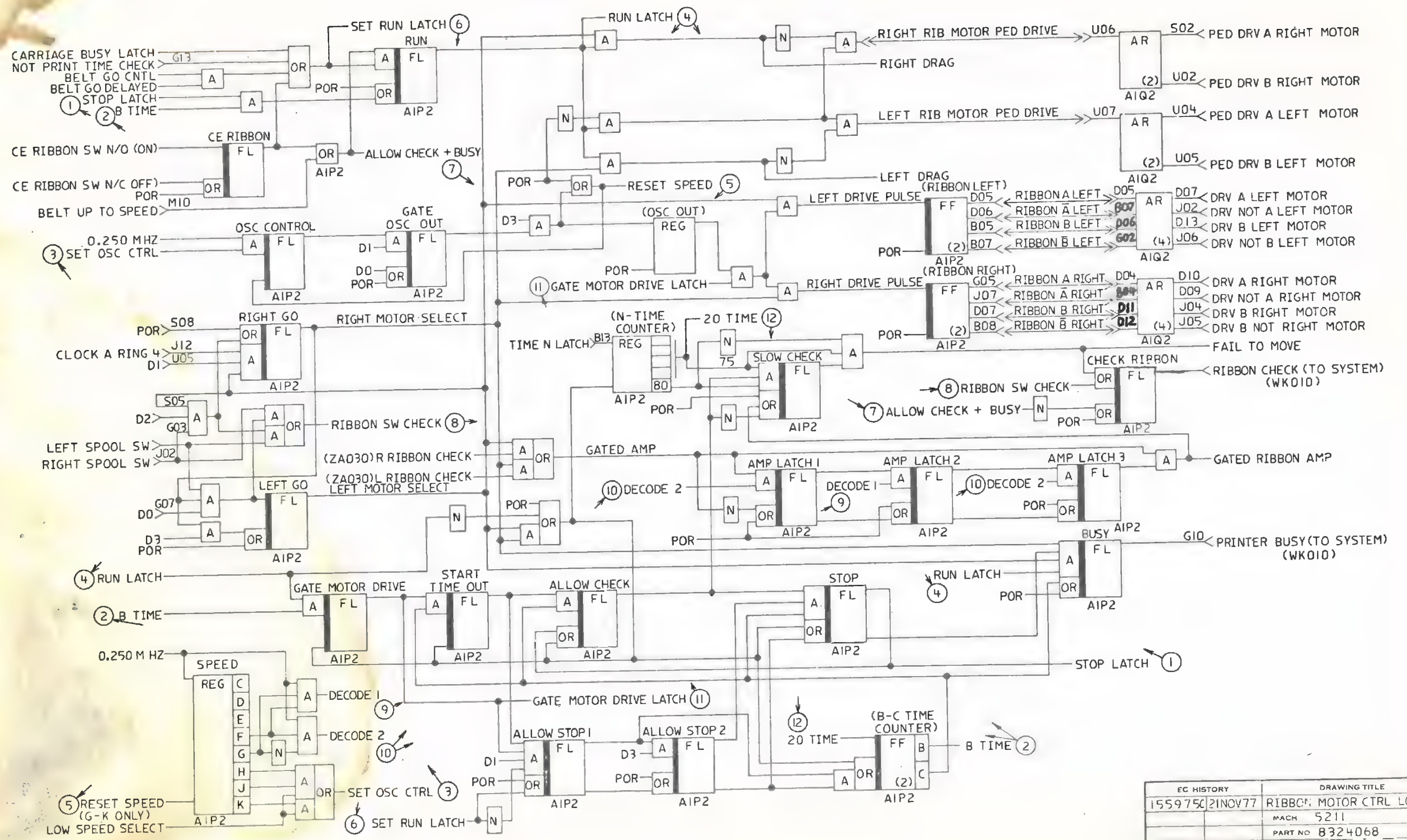
NOTE 1 PROBE POINTS IN PARENTHESES ARE FOR LEFT DRIVE

| EC HISTORY |         | DRAWING TITLE               |          |
|------------|---------|-----------------------------|----------|
| 15NOV77    | 155975C | RIBBON MOTOR CONTROL TIMING |          |
|            |         | MACH                        | 5211     |
|            |         | PART NO 8324067             |          |
| C          |         | CLASSIFICATION              | IBM CORP |
|            |         |                             |          |

19-055

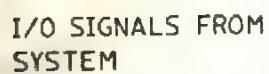
19-055





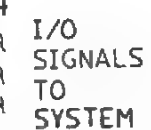
| EC HISTORY |           | DRAWING TITLE           |  |
|------------|-----------|-------------------------|--|
| 1559750    | 21 NOV 77 | RIBBON MOTOR CTRL LOGIC |  |
|            |           | MACH 5211               |  |
|            |           | PART NO 8324068         |  |
|            |           | CLASSIFICATION          |  |
|            |           | I T T CORP              |  |

19-060

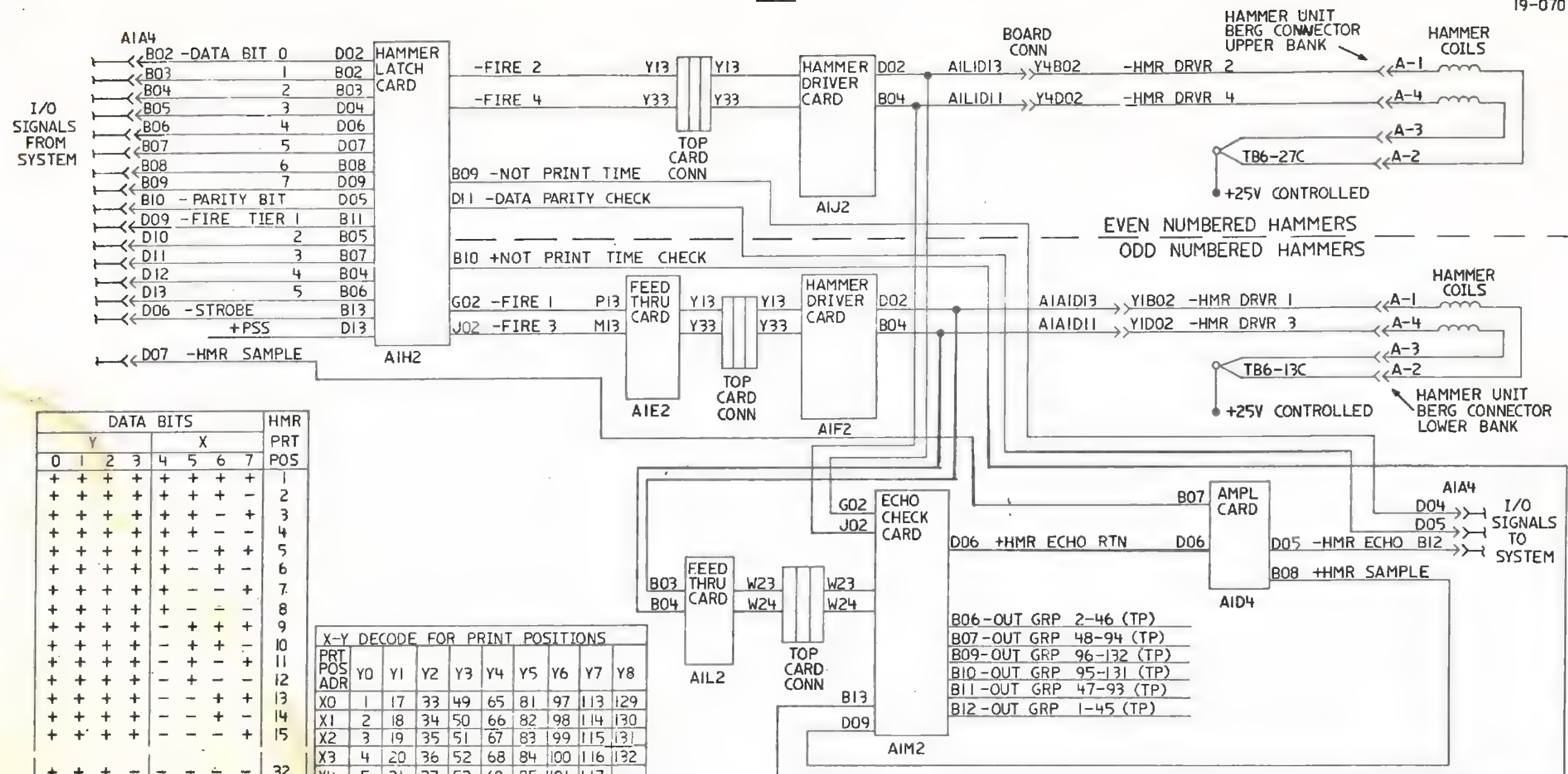


**NOTE**

19065

TC





| DATA BITS |   |   |   |   |   |   |   | HMR |
|-----------|---|---|---|---|---|---|---|-----|
| Y         |   |   |   | X |   |   |   | PRT |
| 0         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | POS |
| +         | + | + | + | + | + | + | + | 1   |
| +         | + | + | + | + | + | + | - | 2   |
| +         | + | + | + | + | + | - | + | 3   |
| +         | + | + | + | + | + | - | - | 4   |
| +         | + | + | + | + | - | + | + | 5   |
| +         | + | + | + | + | - | + | - | 6   |
| +         | + | + | + | + | - | - | + | 7   |
| +         | + | + | + | + | - | - | - | 8   |
| +         | + | + | + | - | + | + | + | 9   |
| +         | + | + | + | - | + | + | - | 10  |
| +         | + | + | + | - | + | - | + | 11  |
| +         | + | + | + | - | + | - | - | 12  |
| +         | + | + | + | - | - | + | + | 13  |
| +         | + | + | + | - | - | + | - | 14  |
| +         | + | + | + | - | - | - | + | 15  |
| +         | + | + | - | - | - | - | - | 32  |
| +         | + | - | + | - | - | - | - | 48  |
| +         | + | - | - | - | - | - | - | 64  |
| +         | - | + | + | - | - | - | - | 80  |
| +         | - | + | - | - | - | - | - | 96  |
| +         | - | - | + | - | - | - | - | 112 |
| +         | - | - | - | - | - | - | - | 128 |
| -         | + | + | + | - | - | - | - | 132 |

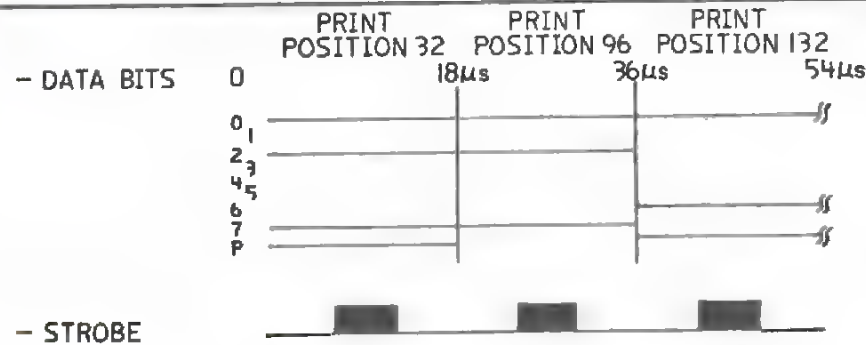
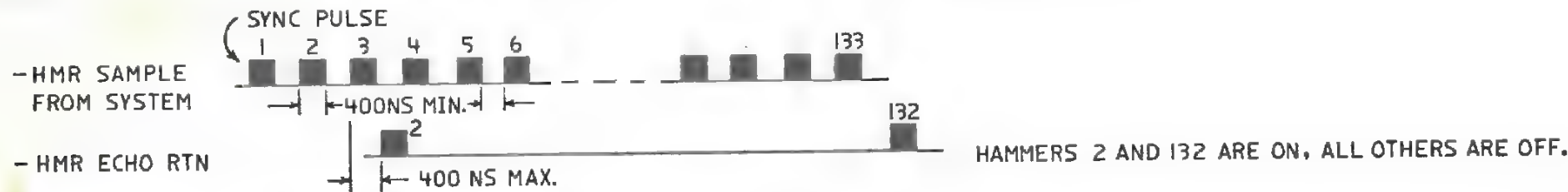
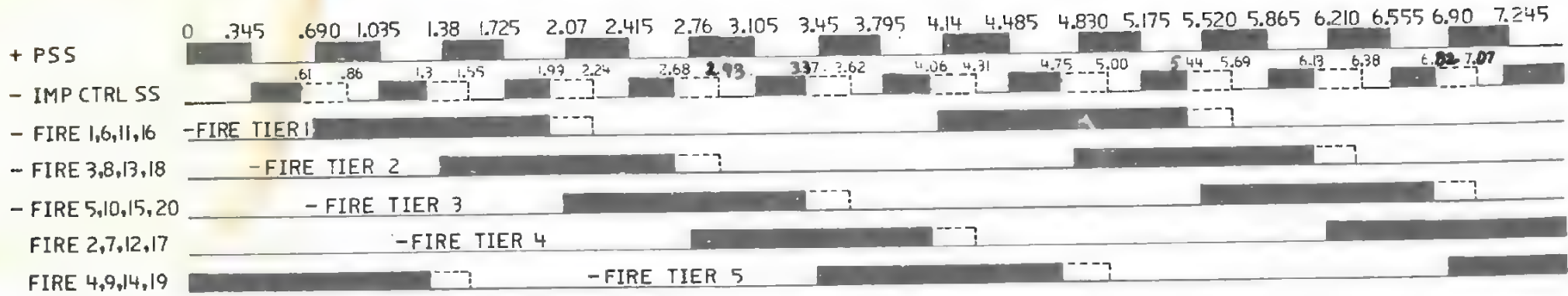
| X-Y DECODE FOR PRINT POSITIONS |    |    |    |    |    |    |     |     |     |
|--------------------------------|----|----|----|----|----|----|-----|-----|-----|
| PRT<br>POS<br>ADR              | Y0 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6  | Y7  | Y8  |
| X0                             | 1  | 17 | 33 | 49 | 65 | 81 | 97  | 113 | 129 |
| X1                             | 2  | 18 | 34 | 50 | 66 | 82 | 98  | 114 | 130 |
| X2                             | 3  | 19 | 35 | 51 | 67 | 83 | 99  | 115 | 131 |
| X3                             | 4  | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 |
| X4                             | 5  | 21 | 37 | 53 | 69 | 85 | 101 | 117 |     |
| X5                             | 6  | 22 | 38 | 54 | 70 | 86 | 102 | 118 |     |
| X6                             | 7  | 23 | 39 | 55 | 71 | 87 | 103 | 119 |     |
| X7                             | 8  | 24 | 40 | 56 | 72 | 88 | 104 | 120 |     |
| X8                             | 9  | 25 | 41 | 57 | 73 | 89 | 105 | 121 |     |
| X9                             | 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 |     |
| X10                            | 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 |     |
| X11                            | 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 |     |
| X12                            | 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 |     |
| X13                            | 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 |     |
| X14                            | 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 |     |
| X15                            | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 |     |

REFER TO LOGIC WIRING  
DIAGRAM SECTION 18 FOR  
POINT TO POINT WIRING OF  
EACH HAMMER COIL

|   |            |         |                              |          |
|---|------------|---------|------------------------------|----------|
| C | EC HISTORY |         | DRAWING TITLE                |          |
|   | 15NOV77    | 155975C | HAMMER CONTROL DIAG. MODEL 2 |          |
|   |            |         | MACH 5211 MODEL 2            |          |
|   |            |         | PART NO 8324070              |          |
|   |            |         | CLASSIFICATION               | IBM CORP |



PRINT CONTROL TIMING (MODEL I & II)



DATA MUST BE ACTIVE .6  $\mu$ s BEFORE STROBE IS ACTIVE  
DATA MUST REMAIN ACTIVE .6  $\mu$ s AFTER STROBE IS ACTIVE  
STROBE PULSE WIDTH MUST BE .6  $\mu$ s  
TIME BETWEEN STROBE PULSES MUST BE 1.8  $\mu$ s  
ALL TIMINGS ARE MINIMUM

| EC HISTORY |         | DRAWING TITLE         |          |
|------------|---------|-----------------------|----------|
| 15 NOV 77  | 155975C | HAMMER CONTROL TIMING |          |
|            |         | MACH 5211             |          |
|            |         | PART NO 8324071       |          |
| C          |         | CLASSIFICATION        | IBM CORP |
|            |         |                       |          |













**Maintenance Library**



**Printer  
Parts Catalog**



**Preface**

This Parts Catalog (PC) contains listings and illustrations of all replaceable assemblies, subassemblies and detail parts released on or before February 1, 1978..

This Parts Catalog is Section 20 of the *S211 Maintenance Information Manual* and uses 20 as a prefix for page numbering.

*Second Edition* (March 1978)

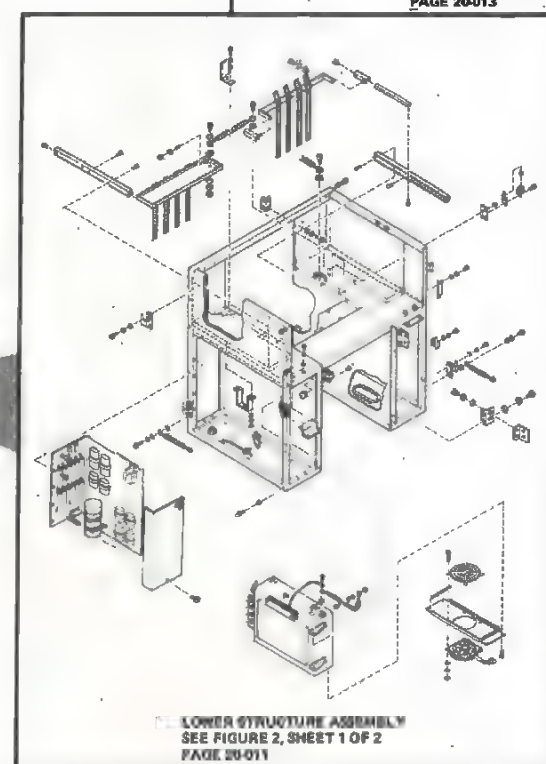
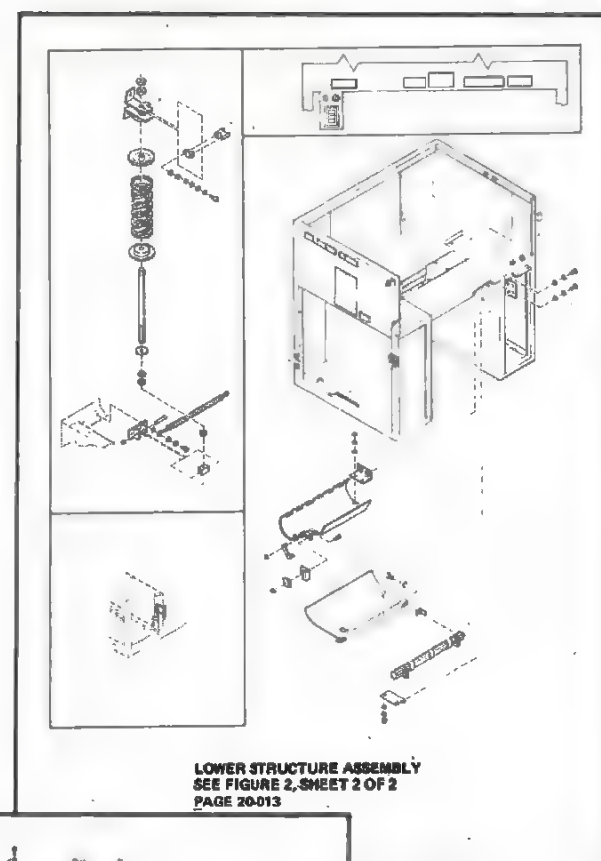
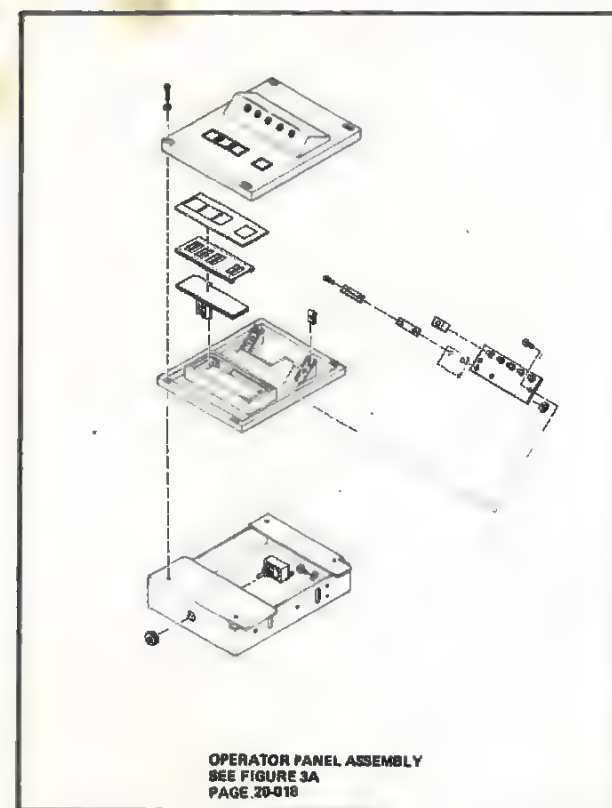
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Changes that affect this catalog are made periodically; any such changes will be reported in subsequent revisions or Technical Newsletters.

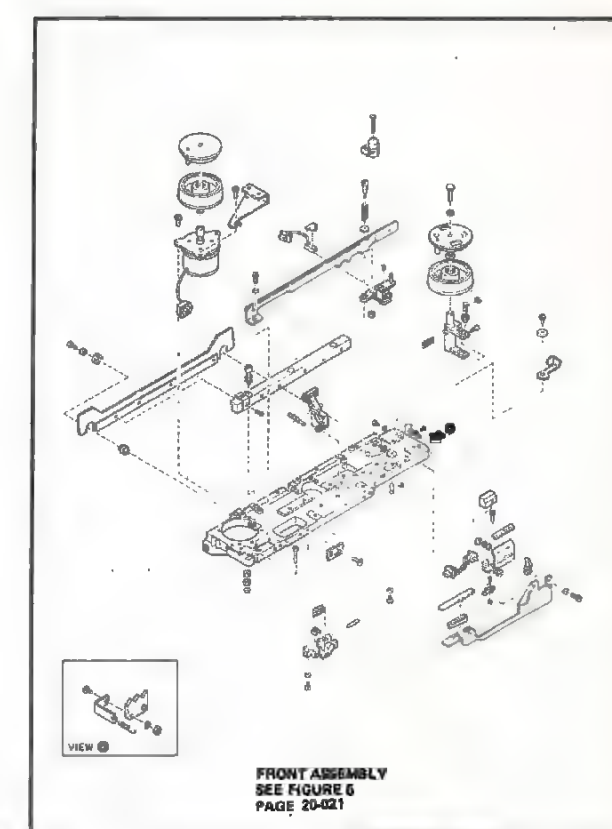
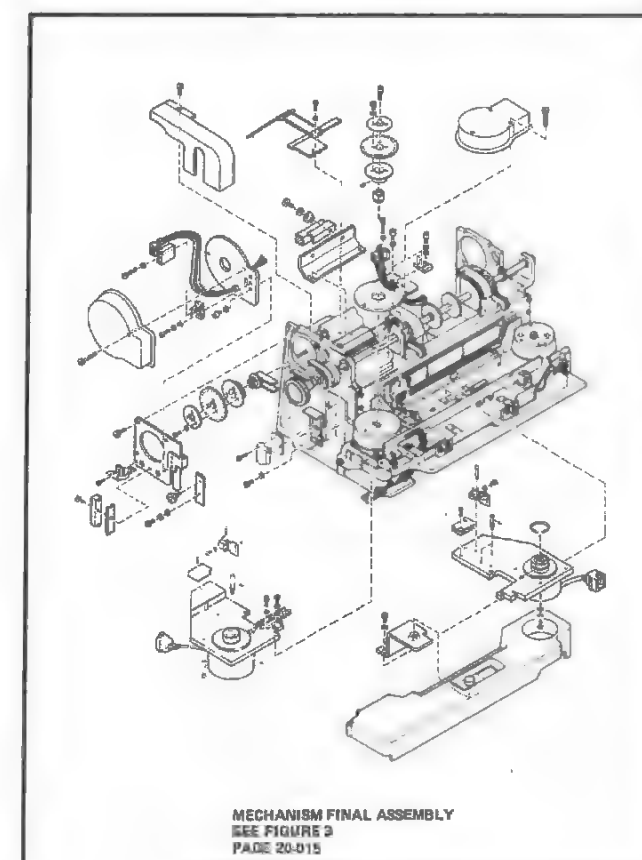
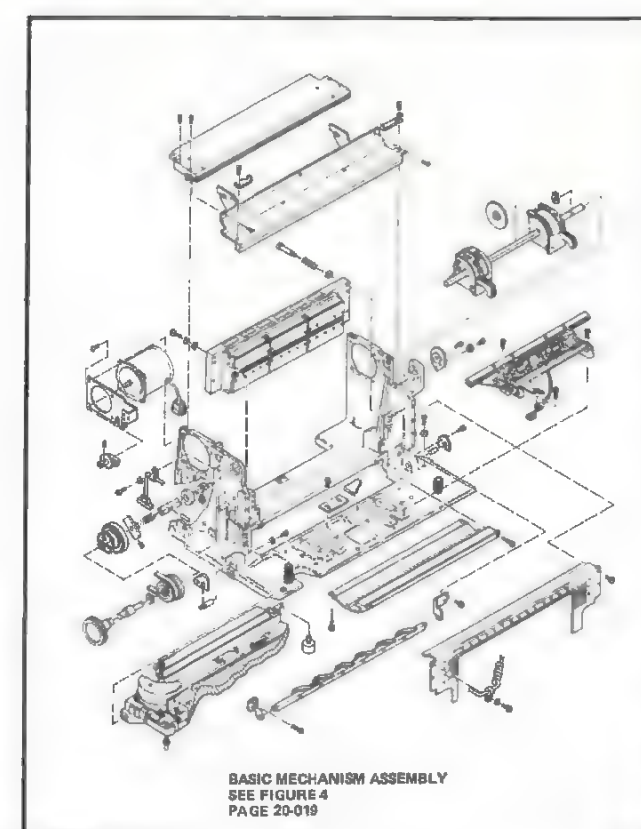
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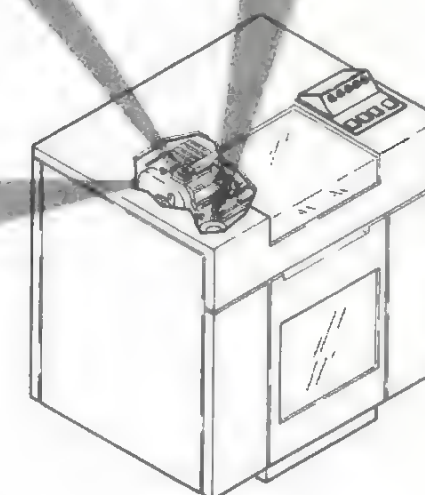
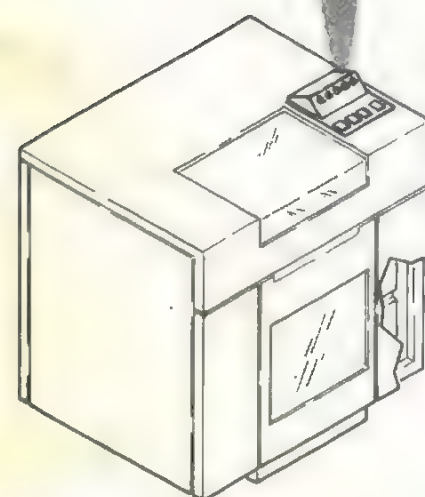
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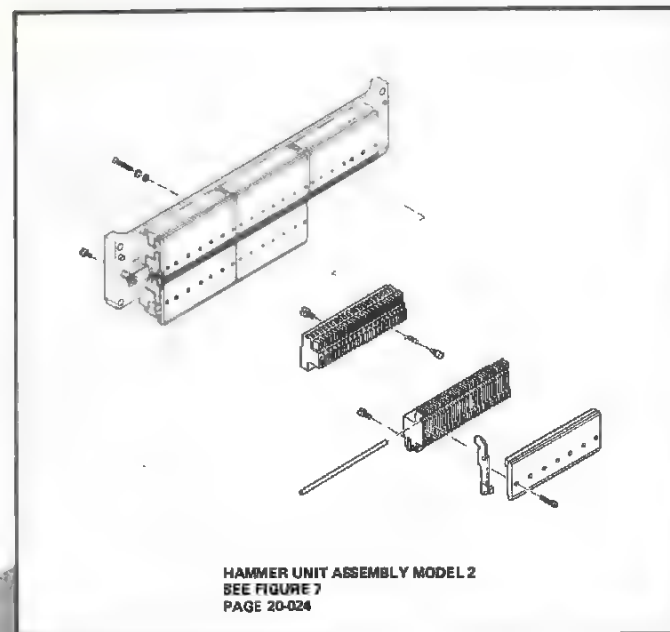
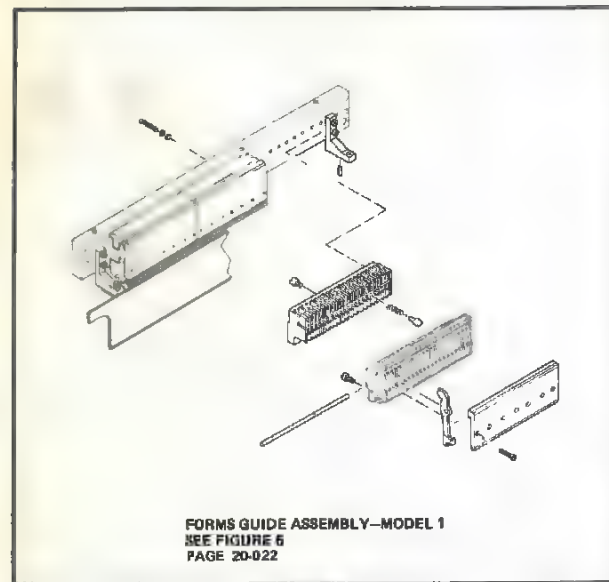


VISUAL INDEX 3

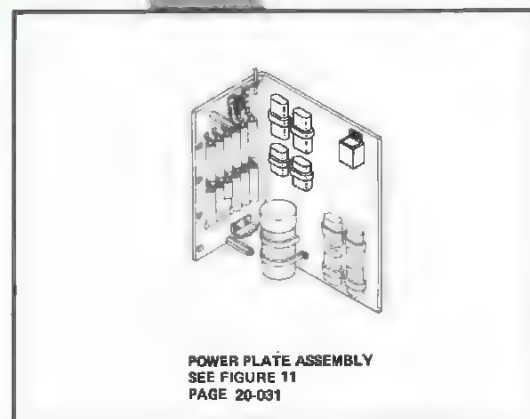
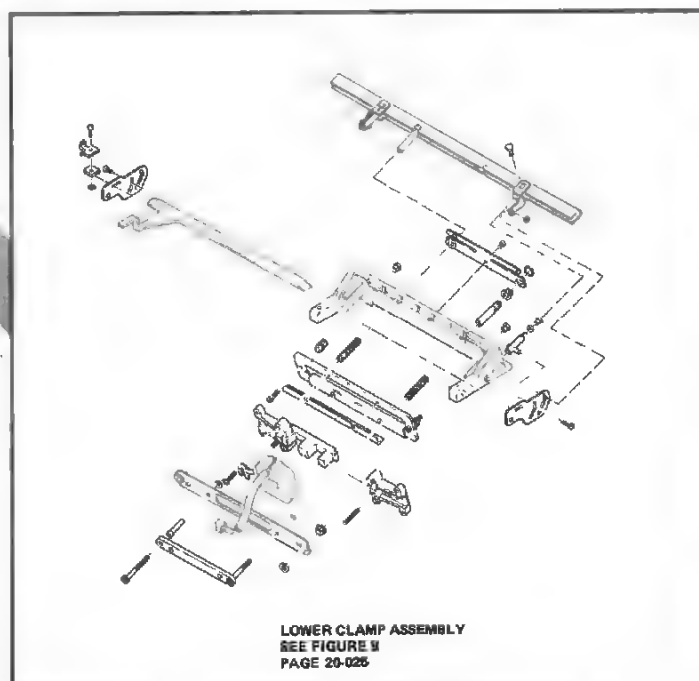


VISUAL INDEX 4

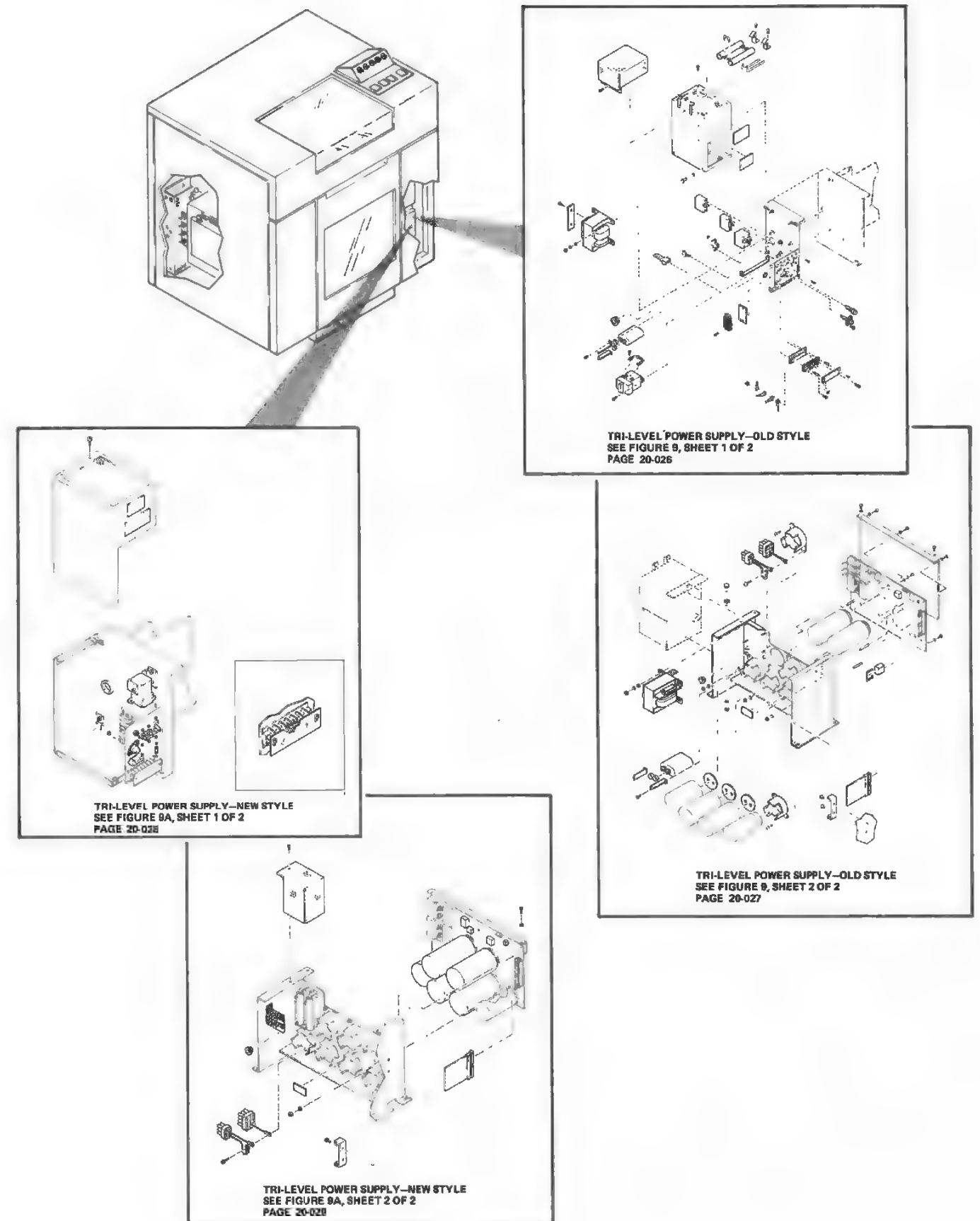




CABLE ASSEMBLIES  
WITH COMPONENT PARTS  
SEE FIGURE 12  
PAGE 20-033



VISUAL INDEX 5



VISUAL INDEX 6



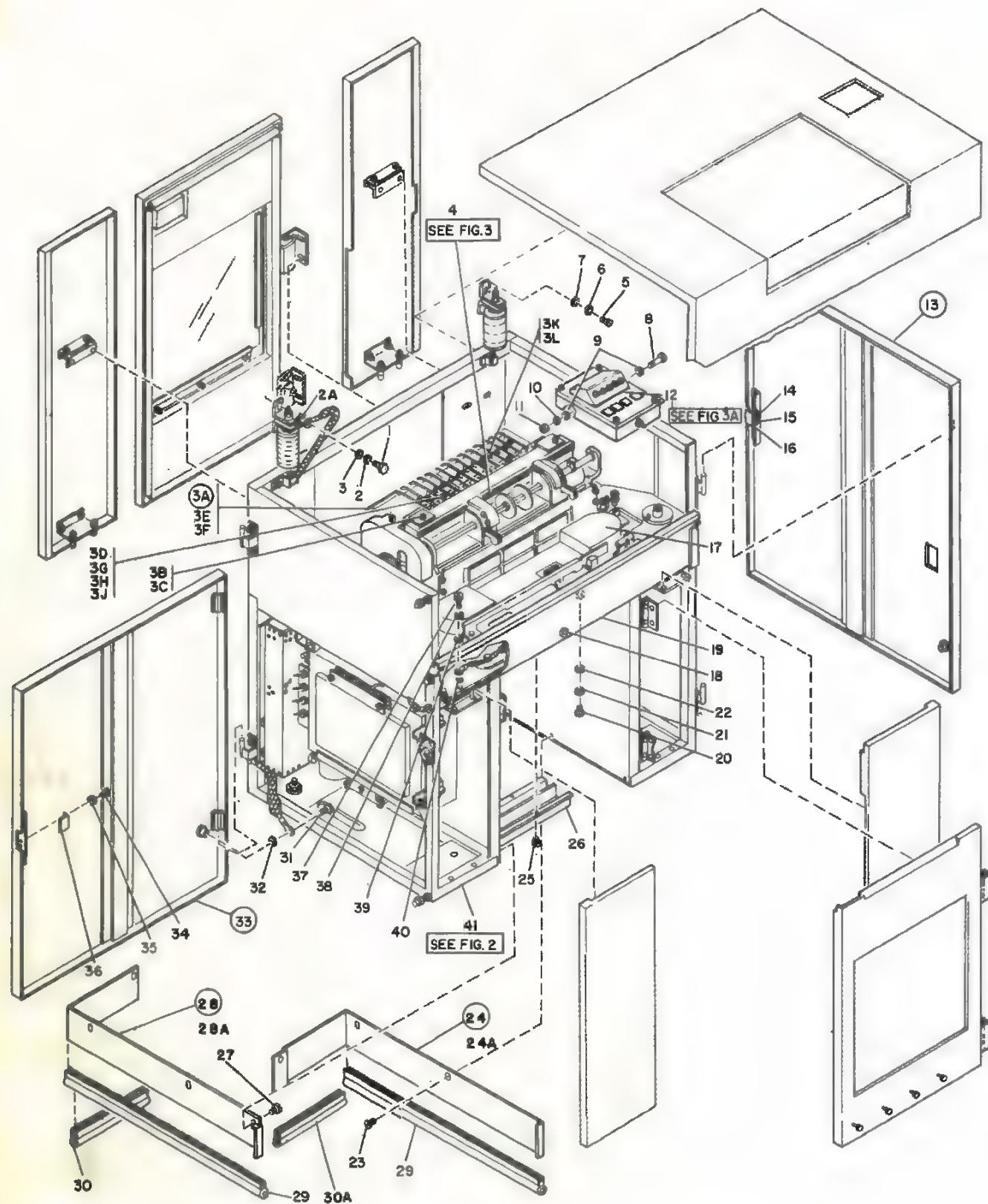
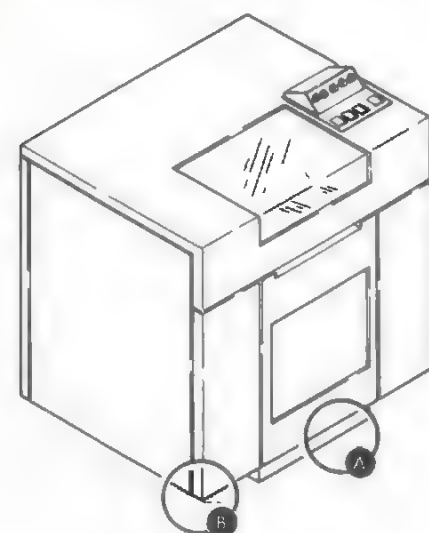
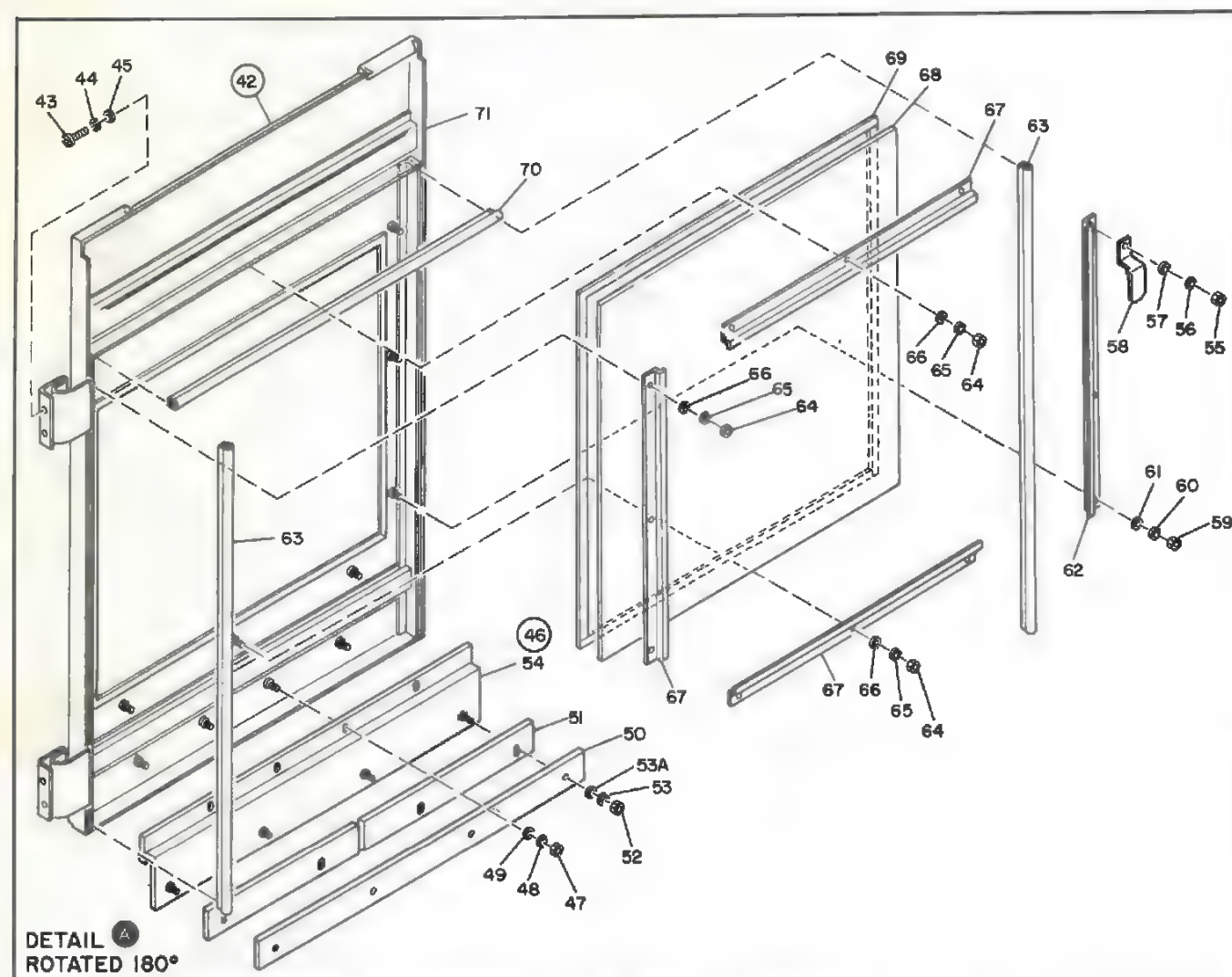


FIGURE 1. FINAL ASSEMBLY. SHEET 1 OF 5. INDEX NOS. 1-41 SEE LIST 1.

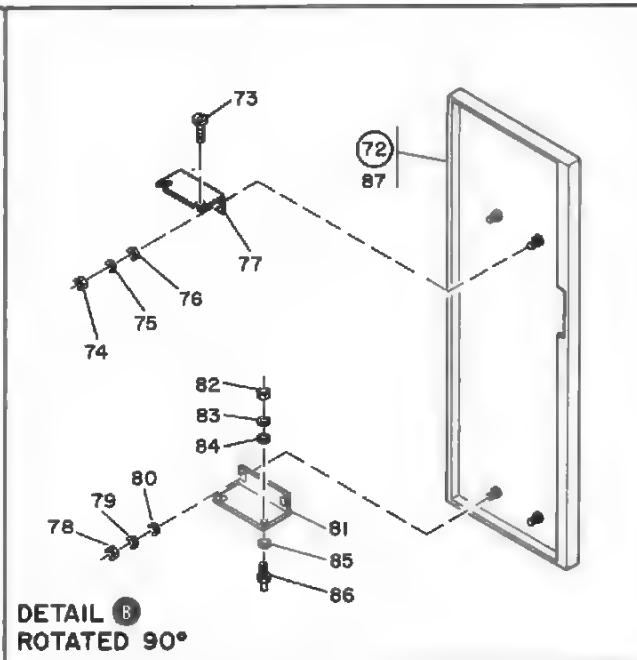
# FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                               |
|----------------------------|----------------|----------------------|---|
| 1 -                        | 4135002        | 1                    | FINAL ASSEMBLY, MODEL 1                   |
| -                          | 1815100        | 1                    | FINAL ASSEMBLY, MODEL 2                   |
| - 1                        | 120211         | 1                    | FOR ILLUSTRATION SEE FIGURE 1             |
| - 2                        | 9092           | 1                    | SCREW, HEX HD- 10-32 X 0.500 LG           |
| - 2A                       | 56079          | 1                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| - 3                        | 1940           | 1                    | LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O |
| - 3A                       | 5593466        | 1                    | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| - 3B                       | 34512          | 2                    | GUIDE ASM, UPPER                          |
| - 3C                       | 22478          | 2                    | SCREW, BD HD- 8-32 X 0.375 LG             |
| - 3D                       | 119            | 2                    | WASHER, FL- 0.170 ID X 0.375 OD           |
| - 3E                       | 1815105        | 1                    | SCREW, MACH FL CSK HD- 8-32 X 0.500 LG    |
| - 3F                       | 5593465        | 1                    | GUIDE, UPPER                              |
| - 3G                       | 22478          | 2                    | COVER                                     |
| - 3H                       | 1090873        | 2                    | WASHER, FL- 0.170 ID X 0.375 OD           |
| - 3J                       | 257189         | 2                    | LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD    |
| - 3K                       | 850248         | 1                    | NUT, HEX- 8-32                            |
| - 3L                       | 236849         | 1                    | TINSEL                                    |
| - 4                        | 1808563        | 2                    | SCREW, BD HD- 10-32 X 0.250 LG            |
| - 4                        | 1808564        | 1                    | MECHANISM FINAL ASSEMBLY, MODEL 1         |
| - 4                        | 1808564        | 1                    | FOR DETAIL BREAKDOWN SEE FIGURE 3         |
| - 4                        | 1808564        | 1                    | MECHANISM FINAL ASSEMBLY, MODEL 2         |
| - 4                        | 1808564        | 1                    | FOR DETAIL BREAKDOWN SEE FIGURE 3         |
| - 5                        | 130434         | 3                    | SCREW, SLOTTED HEX HD 10-32 X 0.375 LG    |
| - 6                        | 9092           | 3                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| - 7                        | 1940           | 3                    | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| - 8                        | 36112          | 2                    | SCREW, SLOTTED HEX HD- 1/4-20 X 1.500 LG  |
| - 9                        | 3550           | 4                    | WASHER, FL- 0.250 ID X 0.562 OD           |
| - 10                       | 6935           | 2                    | LOCKWASHER, SPLIT- 0.250 ID X 0.493 OD    |
| - 11                       | 36109          | 2                    | NUT, HEX- 1/4-20                          |
| - 12                       | 5553448        | 1                    | OPERATOR PANEL                            |
| - 12                       | 5553448        | 1                    | FOR DETAIL BREAKDOWN SEE FIGURE 3A        |
| - 13                       | 4135007        | 1                    | COVER ASM, BLUE                           |
| - 13                       | 5576650        | 1                    | COVER ASM, RED                            |
| - 13                       | 5576652        | 1                    | COVER ASM, GREY                           |
| - 13                       | 5576654        | 1                    | COVER ASM, YELLOW                         |
| - 14                       | 58207          | 4                    | SCREW, BD HD- 8-32 X 0.250 LG             |
| - 15                       | 185116         | 4                    | WASHER                                    |
| - 16                       | 833697         | 2                    | STRIKE                                    |
| - 17                       | 5576666        | 1                    | COVER ASM                                 |
| - 18                       | 637733         | 1                    | SCREW, SEM HEX HD- 10-32 X 0.465 LG       |
| - 19                       | 4138367        | 1                    | PLATE ASM                                 |
| - 20                       | 38686          | 4                    | SCREW, HEX HD- 1/4-20 X 0.500 LG          |
| - 21                       | 6935           | 4                    | LOCKWASHER, SPLIT- 0.250 ID X 0.493 OD    |
| - 22                       | 3550           | 4                    | WASHER, FL- 0.250 ID X 0.562 OD           |
| - 23                       | 236849         | 4                    | SCREW, BD HD- 10-32 X 0.250 LG            |
| - 24                       | 6808567        | 1                    | SKIRT ASSEMBLY                            |
| - 24A                      | 4134960        | 1                    | SKIRT                                     |
| - 25                       | 332620         | 6                    | SCREW, BD HD- 10-32 X 0.500 LG            |
| - 26                       | 1819764        | 1                    | CHANNEL                                   |
| - 27                       | 236849         | 3                    | SCREW, BD HD- 10-32 X 0.250 LG            |
| - 28                       | 6808568        | 1                    | SKIRT ASSEMBLY                            |
| - 28A                      | 4134955        | 1                    | SKIRT                                     |
| - 29                       | 4138390        | 1                    | SEAL                                      |
| - 30                       | 4138396        | 1                    | SEAL                                      |
| - 30A                      | 6808566        | 1                    | SEAL                                      |
| - 31                       | 236849         | 2                    | SCREW, BD HD- 10-32 X 0.250 LG            |
| - 32                       | 56079          | 2                    | LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O |
| - 33                       | 4135007        | 2                    | COVER ASM, BLUE                           |
| - 33                       | 5576650        | 1                    | COVER ASM, RED                            |
| - 33                       | 5576652        | 1                    | COVER ASM, GREY                           |
| - 33                       | 5576654        | 1                    | COVER ASM, YELLOW                         |
| - 34                       | 58207          | 4                    | SCREW, BD HD- 8-32 X 0.250 LG             |
| - 35                       | 185116         | 4                    | WASHER                                    |
| - 36                       | 833697         | 2                    | STRIKE                                    |
| - 37                       | 120211         | 1                    | SCREW, HEX HD- 10-32 X 0.500 LG           |
| - 38                       | 9092           | 1                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| - 39                       | 1940           | 1                    | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| - 40                       | 56079          | 4                    | LOCKWASHER, EXT TEETH- 0.20 ID X 0.41 OD  |
| - 41                       | 1815055        | 1                    | LOWER STRUCTURE ASSEMBLY                  |
| - 41                       | 1815055        | 1                    | FOR DETAIL BREAKDOWN SEE FIGURE 2         |

ATT PT



FRONT VIEW



DETAIL B  
ROTATED 90°

FIGURE 1. FINAL ASSEMBLY. SHEET 2 OF 5. INDEX NOS. 42-87SEE LIST 1.

# FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                            |
|----------------------------|----------------|----------------------|--|
| 1 - 42                     | 4138346        | 1                    | DOOR ASM                               |
| - 43                       | 130434         | 4                    | SCREW, SLOTTED HEX HI 10-32 X 0.375 LG |
| - 44                       | 9092           | 4                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 45                       | 1940           | 4                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 46                       | 6808569        | 1                    | SKIRT ASM                              |
| - 47                       | 11598          | 4                    | NUT, HEX- 10-32                        |
| - 48                       | 9092           | 4                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 49                       | 1940           | 4                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 50                       | 4135082        | 1                    | PLATE                                  |
| - 51                       | 4135127        | 2                    | PAD                                    |
| - 52                       | 11598          | 4                    | NUT, HEX- 10-32                        |
| - 53                       | 9092           | 4                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 53A                      | 1940           | 4                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 54                       | 1819773        | 1                    | BRACKET                                |
| - 55                       | 11598          | 1                    | NUT, HEX- 10-32                        |
| - 56                       | 1940           | 1                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 57                       | 9092           | 1                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 58                       | 5576638        | 1                    | STRIKE                                 |
| - 59                       | 11598          | 2                    | NUT, HEX- 10-32                        |
| - 60                       | 45690          | 2                    | WASHER, FL- 0.203 ID X 0.438 OD        |
| - 61                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 62                       | 4138349        | 1                    | CLAMP                                  |
| - 63                       | 2526535        | 2                    | SEAL, 72 INCHES LG                     |
| - 64                       | 11598          | 9                    | NUT, HEX- 10-32                        |
| - 65                       | 45690          | 9                    | WASHER, FL- 0.203 ID X 0.438 OD        |
| - 66                       | 9092           | 9                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 67                       | 4138349        | 3                    | CLAMP                                  |
| - 68                       | 1815113        | 1                    | GLASS                                  |
| - 69                       | 4138391        | 1                    | SEAL                                   |
| - 70                       | 2526535        | 1                    | SEAL, 72 INCHES LG                     |
| - 71                       | 4138347        | 1                    | DOOR                                   |
| - 72                       | 5576669        | 1                    | COVER ASSEMBLY, LEFT FRONT             |
| - 73                       | 32042          | 2                    | SCREW, BD HD- 10-32 X 0.375 LG         |
| - 74                       | 11598          | 2                    | NUT, HEX- 10-32                        |
| - 75                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 76                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 77                       | 4138371        | 1                    | BRACKET                                |
| - 78                       | 11598          | 2                    | NUT, HEX- 10-32                        |
| - 79                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 80                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 81                       | 1819763        | 1                    | BRACKET                                |
| - 82                       | 11598          | 2                    | NUT, HEX- 10-32                        |
| - 83                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| - 84                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 85                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| - 86                       | 474405         | 2                    | PIN                                    |
| - 87                       | 1815117        | 1                    | COVER                                  |



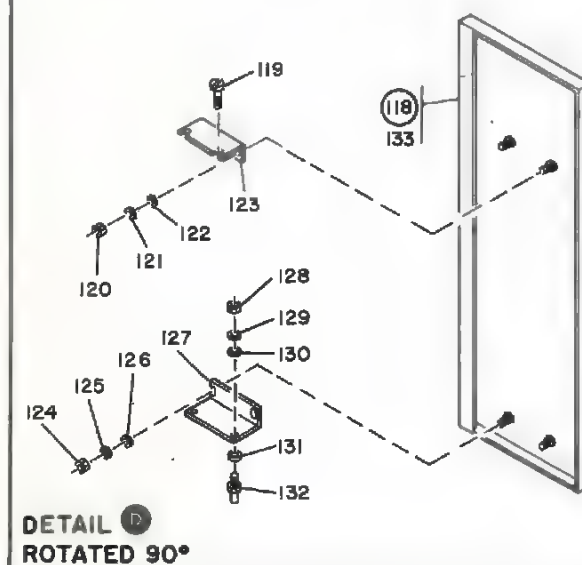
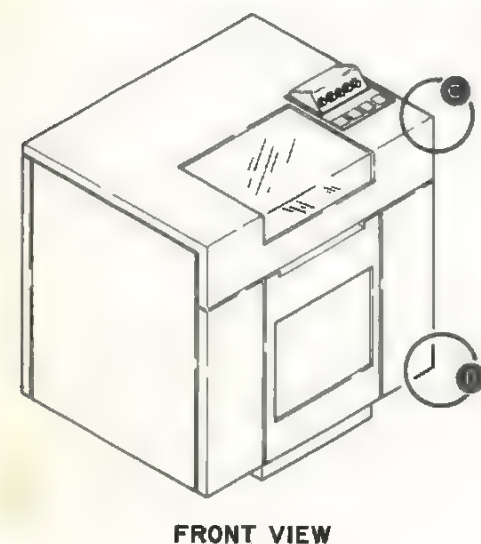
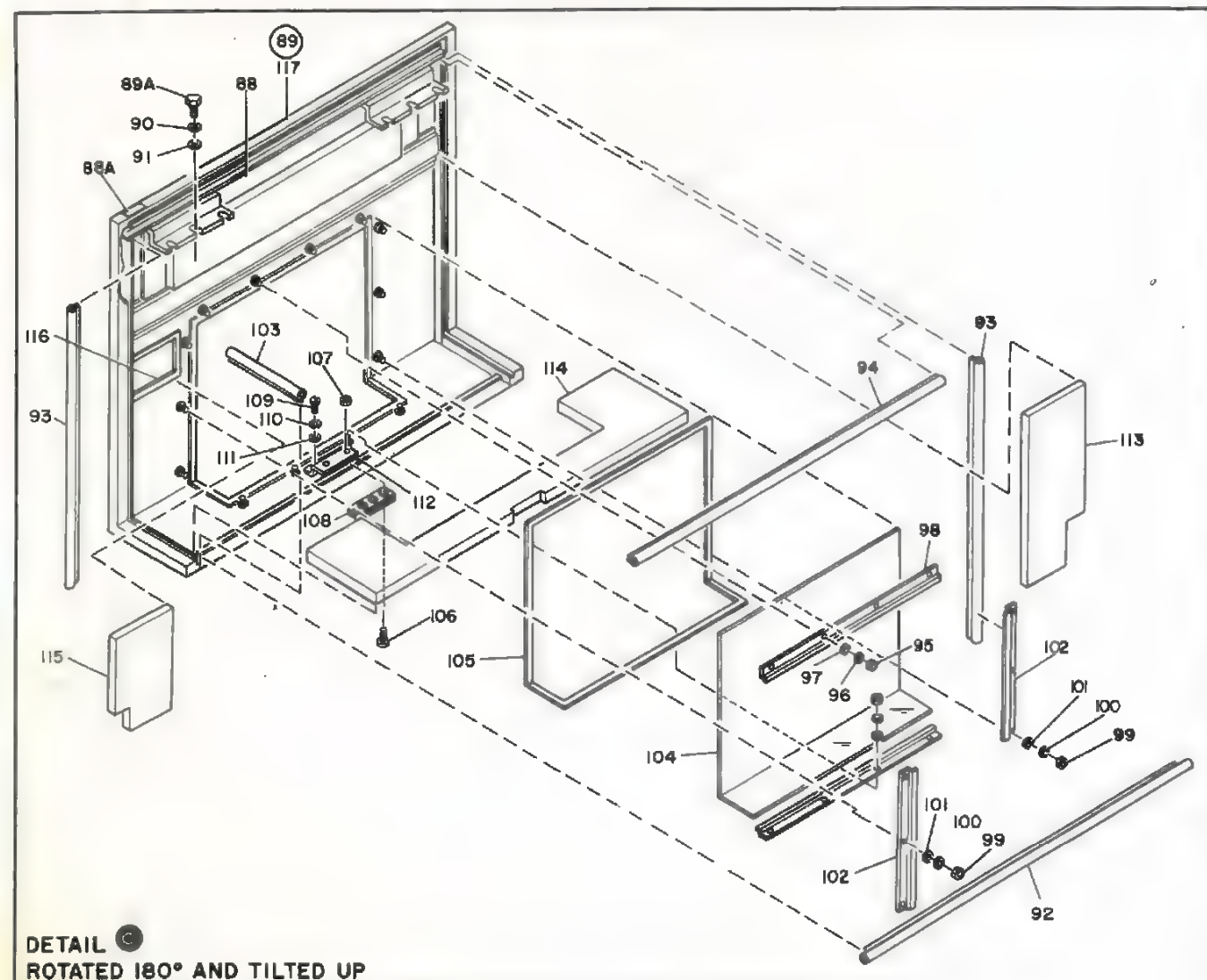
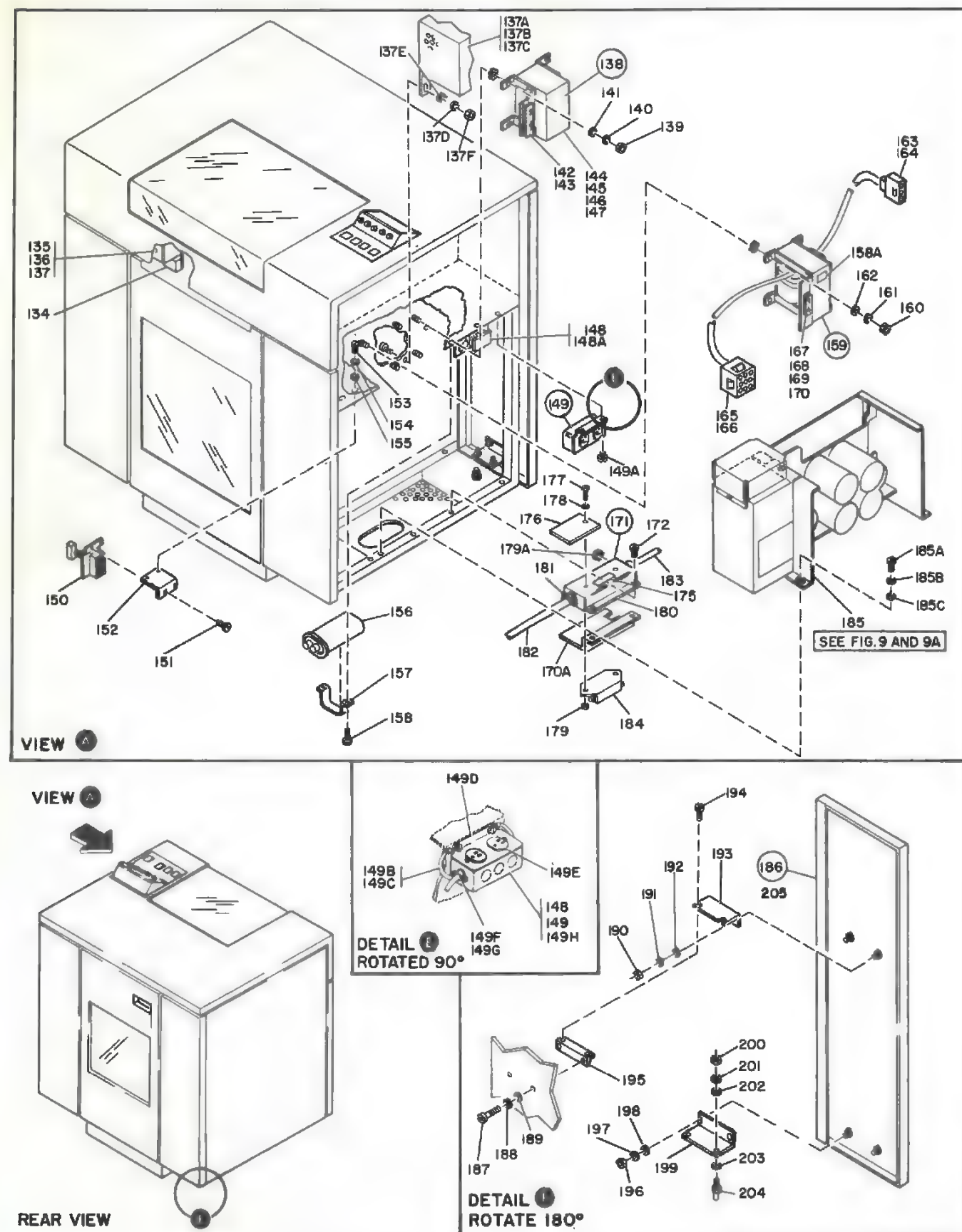


FIGURE 1. FINAL ASSEMBLY. SHEET 3 OF 5. INDEX NOS. 88-133. SEE LIST 1.

| FINAL ASSEMBLY             |                |                      |  |   |   |   |
|----------------------------|----------------|----------------------|--|---|---|---|
| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                              |   |   |   |
|                            |                |                      | 1  | 2 | 3 | 4 |
| 1 - 88                     | 8330332        | 1                    | . PAD                                    |   |   |   |
| - 88A                      | 911932         | 1                    | . LABEL                                  |   |   |   |
| - 89                       | 4138139        | 1                    | . COVER ASM, TOP                         |   |   |   |
| - 89A                      | 38686          | 6                    | . SCREW, HEX HD- 1/4-20 X 0.500 LG       |   |   |   |
| - 90                       | 6935           | 6                    | . LOCKWASHER, SPLIT- 0.250 ID X 0.493 OD |   |   |   |
| - 91                       | 3550           | 6                    | . WASHER, FL- 0.250 ID X 0.562 OD        |   |   |   |
| - 92                       | 2526535        | 2                    | . SEAL, 72 INCHES LG                     |   |   |   |
| - 93                       | 2526535        | 2                    | . SEAL, 72 INCHES LG                     |   |   |   |
| - 94                       | 2526535        | 2                    | . SEAL, 72 INCHES LG                     |   |   |   |
| - 95                       | 11598          | 8                    | . NUT, HEX- 10-32                        |   |   |   |
| - 96                       | 9092           | 8                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 97                       | 45690          | 8                    | . WASHER, FL- 0.203 ID X 0.438 OD        |   |   |   |
| - 98                       | 4138394        | 2                    | . CLAMP                                  |   |   |   |
| - 99                       | 11598          | 6                    | . NUT, HEX- 10-32                        |   |   |   |
| - 100                      | 9092           | 6                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 101                      | 45690          | 6                    | . WASHER, FL- 0.203 ID X 0.438 OD        |   |   |   |
| - 102                      | 4138345        | 2                    | . CLAMP                                  |   |   |   |
| - 103                      | 2526535        | 2                    | . SEAL, 72 INCHES LG                     |   |   |   |
| - 104                      | 4138341        | 1                    | . GLASS                                  |   |   |   |
| - 105                      | 4138391        | 1                    | . SEAL                                   |   |   |   |
| - 106                      | 438552         | 2                    | . SCREW, WASH BD HD- 4-40 X 0.750 LG     |   |   |   |
| - 107                      | 37913          | 2                    | . NUT, HEX- 0.375-16                     |   |   |   |
| - 108                      | 848876         | 1                    | . LATCH ASM, COVER                       |   |   |   |
| - 109                      | 32042          | 2                    | . SCREW, BD HD- 10-32 X 0.375 LG         |   |   |   |
| - 110                      | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 111                      | 45690          | 2                    | . WASHER, FL- 0.203 ID X 0.438 OD        |   |   |   |
| - 112                      | 6808521        | 1                    | . BRACKET ASM                            |   |   |   |
| - 113                      | 4138344        | 1                    | . CHANNEL                                |   |   |   |
| - 114                      | 4138342        | 1                    | . CHANNEL                                |   |   |   |
| - 115                      | 4138343        | 1                    | . NUT                                    |   |   |   |
| - 116                      | 6808599        | 1                    | . SEAL                                   |   |   |   |
| - 117                      | 4138340        | 1                    | . COVER                                  |   |   |   |
| - 118                      | 5576670        | 1                    | . COVER ASM, RIGHT FRONT                 |   |   |   |
| - 119                      | 32042          | 2                    | . SCREW, BD HD- 10-32 X 0.375 LG         |   |   |   |
| - 120                      | 11598          | 2                    | . NUT, HEX- 10-32                        |   |   |   |
| - 121                      | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 122                      | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |   |
| - 123                      | 4138371        | 1                    | . BRACKET                                |   |   |   |
| - 124                      | 11598          | 2                    | . NUT, HEX- 10-32                        |   |   |   |
| - 125                      | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 126                      | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |   |
| - 127                      | 1819763        | 1                    | . BRACKET                                |   |   |   |
| - 128                      | 11598          | 2                    | . NUT, HEX- 10-32                        |   |   |   |
| - 129                      | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |   |
| - 130                      | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |   |
| - 131                      | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |   |
| - 132                      | 474405         | 2                    | . PIN                                    |   |   |   |
| - 133                      | 1815119        | 1                    | . COVER                                  |   |   |   |





| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                                 |
|----------------------------|----------------|----------------------|---|
|                            |                |                      | 1 2 3 4                                     |
| 1 -134                     | 5576696        | 1                    | . STRIKE                                    |
| -135                       | 38381          | 2                    | . SCREW, FIL HD- 10-32 X 0.312 LG           |
| -136                       | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -137                       | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -137A                      | 6808593        | 1                    | . COVER ASM                                 |
| -137B                      | 2180701        | 1                    | . SCREW                                     |
| -137C                      | 130434         | 2                    | . SCREW, SLOTTED HEX HT 10-32 X 0.375 LG    |
| -137D                      | 9092           | 3                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -137E                      | 1940           | 3                    | . WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -137F                      | 11598          | 1                    | . NUT, HEX- 10-32                           |
| -138                       | 6808518        | 1                    | . TRANSFORMER ASM- 50/60 HZ                 |
| -138                       | 6808585        | 1                    | . TRANSFORMER ASM- 50 HZ                    |
| -139                       | 11598          | 4                    | . NUT, HEX- 10-32                           |
| -140                       | 9092           | 4                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -140A                      | 56079          | 1                    | . LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O |
| -141                       | 1940           | 4                    | . WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -142                       | 10170          | 2                    | . SCREW, BD HD- 6-32 X 0.250 LG             |
| -143                       | 337193         | 1                    | . SHIELD, TERMINAL BOARD 6 POSITION         |
| -144                       | 322550         | 2                    | . SCREW, BD HD- 6-32 X 0.500 LG             |
| -145                       | 322266         | 1                    | . STRIP, MARKER, 6 POS NOS.                 |
| -146                       | 317131         | 1                    | . BLOCK                                     |
| -147                       | 210883         | 2                    | . STUD                                      |
| -148                       | 6808579        | 1                    | . BRACKET ASM                               |
| -148A                      | 332620         | 2                    | . SCREW, BD HD- 10-32 X 0.500 LG            |
| -149                       | 5576641        | 1                    | . OUTLET ASM                                |
| -149A                      | 332620         | 2                    | . SCREW, BD HD- 10-32 X 0.500 LG            |
| -149B                      | 1993977        | 1                    | . JUMPER ASM                                |
| -149C                      | 236849         | 2                    | . SCREW, BD HD- 10-32 X 0.250 LG            |
| -149D                      | 4703239        | 1                    | . BRACKET                                   |
| -149E                      | 357995         | 1                    | . OUTLET, CONV 115V 60 HZ                   |
| -149F                      | 151598         | 1                    | . CLAMP                                     |
| -149G                      | 38443          | 2                    | . SCREW, FL CSK HD- 6-32 X 0.312 LG         |
| -149H                      | 1993937        | 1                    | . JUMPER ASM                                |
| -150                       | 4138327        | 1                    | . SWITCH ASM                                |
| -151                       | 236849         | 2                    | . SCREW, BD HD- 10-32 X 0.250 LG            |
| -152                       | 5576642        | 1                    | . BRACKET                                   |
| -153                       | 130434         | 2                    | . SCREW, SLOTTED HEX HT 10-32 X 0.375 LG    |
| -154                       | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -155                       | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -156                       | 5252841        | 1                    | . CAPACITOR                                 |
| -157                       | 1145820        | 1                    | . BRACKET                                   |
| -158                       | 5644           | 2                    | . SCREW, FL HD- 6-32 X 0.625 LG             |
| -158A                      | 2582954        | 1                    | . LABEL                                     |
| -159                       | 5593446        | 1                    | . TRANSFORMER ASM, FERRO- 60 HZ             |
| -159                       | 4119618        | 1                    | . TRANSFORMER ASM, FERRO- 50 HZ             |
| -160                       | 11598          | 4                    | . NUT, HEX- 10-32                           |
| -161                       | 9092           | 4                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -161A                      | 56079          | 1                    | . LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O |
| -162                       | 1940           | 4                    | . WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -163                       | 1847536        | 1                    | . CONNECTOR, 15 POSITION                    |
| -164                       | 1471028        | 3                    | . CONTACT                                   |
| -165                       | 1847532        | 1                    | . CONNECTOR                                 |
| -166                       | 1471028        | 6                    | . CONTACT                                   |
| -167                       | 322550         | 2                    | . SCREW, BD HD- 6-32 X 0.500 LG             |
| -168                       | 740554         | 1                    | . STRIP                                     |
| -169                       | 317310         | 1                    | . BLOCK, 5 DBL SCREW TERMINAL               |
| -170                       | 210883         | 2                    | . STUD                                      |
| -170A                      | 4703256        | 1                    | . PLATE ASM                                 |
| -171                       | 5576677        | 1                    | . LINE FILTER ASM 60HZ                      |
| -171                       | 6808547        | 1                    | . LINE FILTER ASM 60 HZ 6 FOOT CORD         |
| -171                       | 5576679        | 1                    | . LINE FILTER ASM 50HZ                      |
| -172                       | 34512          | 2                    | . SCREW, BD HD- 8-32 X 0.375 LG             |
| -175                       | 183755         | 1                    | . LABEL                                     |
| -176                       | 4703232        | 1                    | . PLATE                                     |
| -177                       | 166758         | 2                    | . SCREW, BD HD- 8-32 X 0.437 LG             |
| -178                       | 1090873        | 2                    | . LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD    |
| -179                       | 257189         | 2                    | . NUT, HEX- 8-32                            |
| -179A                      | 850065         | 1                    | . PLUG BUTTON-USED ON 6808547 FILTER ASM    |
| -180                       | 5576663        | 1                    | . COVER, FILTER                             |
| -181                       | 151598         | 2                    | . CLAMP                                     |
| -182                       | 4138338        | 1                    | . CABLE ASM 50-60HZ                         |
|                            |                |                      | FOR COMPONENT PARTS SEE FIGURE 12           |
| -183                       | 1819739        | 1                    | . CABLE ASM 60HZ                            |
|                            |                |                      | FOR COMPONENT PARTS SEE FIGURE 12           |
| -183                       | 4135130        | 1                    | . CABLE ASM 60 HZ-USED ON 6808547 FILTER    |
|                            |                |                      | FOR COMPONENT PARTS SEE FIGURE 12           |
| -183                       | 5576678        | 1                    | . CABLE ASM 50HZ                            |

FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                                |   |   |        |
|----------------------------|----------------|----------------------|--|---|---|--------|
|                            |                |                      | 1  | 2 | 3 | 4      |
| 1                          |                |                      | FOR COMPONENT PARTS SEE FIGURE 12          |   |   |        |
| -184                       | 1862655        | 1                    | . . FILTER                                 |   |   |        |
| -185                       | 4138414        | 1                    | . TRI-LEVEL POWER SUPPLY ASM 60HZ          |   |   |        |
| -185                       | 4138420        | 1                    | . TRI-LEVEL POWER SUPPLY ASM 50HZ          |   |   |        |
|                            |                |                      | FOR DETAIL BREAKDOWN SEE FIGURE 9          |   |   |        |
| -185                       | 5593470        | 1                    | . TRI-LEVEL POWER SUPPLY 50/60 HZ          |   |   |        |
|                            |                |                      | FOR DETAIL BREAKDOWN SEE FIGURE 9A         |   |   |        |
| -185A                      | 38686          |                      | . SCREW, HEX HD- 1/4-20 X 0.500 LG         |   |   |        |
| -185B                      | 6935           |                      | . LOCKWASHER, SPLIT- 0.250 ID X 0.493 OD   |   |   |        |
| -185C                      | 3550           |                      | . WASHER, FL- 0.250 ID X 0.562 OD          |   |   |        |
| -186                       | 5576671        | 1                    | . COVER ASM                                |   |   |        |
| -187                       | 130434         | 2                    | . SCREW, SLOTTED HEX HD 10-32 X 0.375 LG   |   |   | ATT PT |
| -188                       | 9092           | 2                    | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD   |   |   | ATT PT |
| -189                       | 1940           | 2                    | . WASHER, FLAT- 0.192 ID X 0.562 OD        |   |   | ATT PT |
| -190                       | 11598          | 2                    | . . NUT, HEX- 10-32                        |   |   |        |
| -191                       | 9098           | 2                    | . . LOCK WASHER                            |   |   |        |
| -192                       | 1940           | 2                    | . . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |        |
| -193                       | 4138371        | 1                    | . . BRACKET                                |   |   |        |
| -194                       | 32042          | 2                    | . . SCREW, BD HD- 10-32 X 0.375 LG         |   |   |        |
| -195                       | 4138372        | 1                    | . . BRACKET                                |   |   |        |
| -196                       | 11598          | 2                    | . . NUT, HEX- 10-32                        |   |   |        |
| -197                       | 9092           | 2                    | . . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |        |
| -198                       | 1940           | 2                    | . . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |        |
| -199                       | 1819763        | 1                    | . . BRACKET                                |   |   |        |
| -200                       | 11598          | 2                    | . . NUT, HEX- 10-32                        |   |   |        |
| -201                       | 9092           | 2                    | . . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |   |   |        |
| -202                       | 1940           | 2                    | . . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |        |
| -203                       | 1940           | 2                    | . . WASHER, FLAT- 0.192 ID X 0.562 OD      |   |   |        |
| -204                       | 474405         | 2                    | . . PIN                                    |   |   |        |
| -205                       | 4138355        | 1                    | . . COVER                                  |   |   |        |

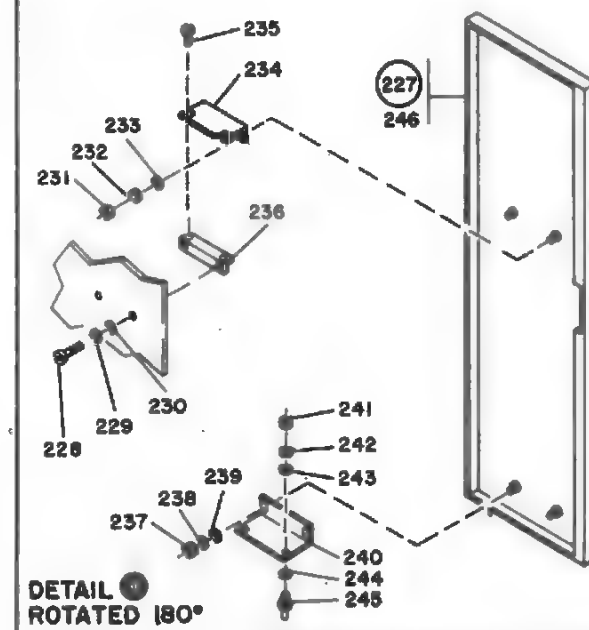
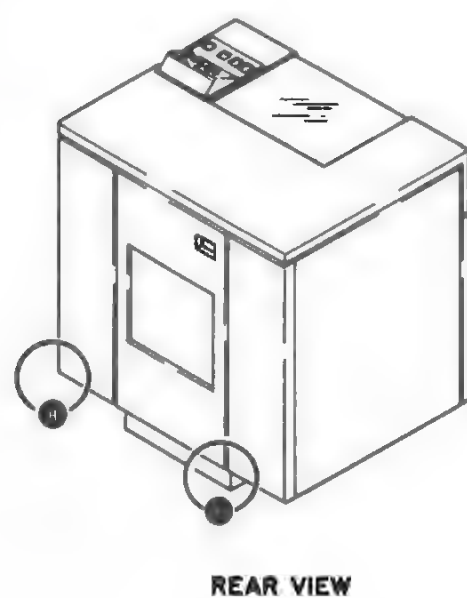
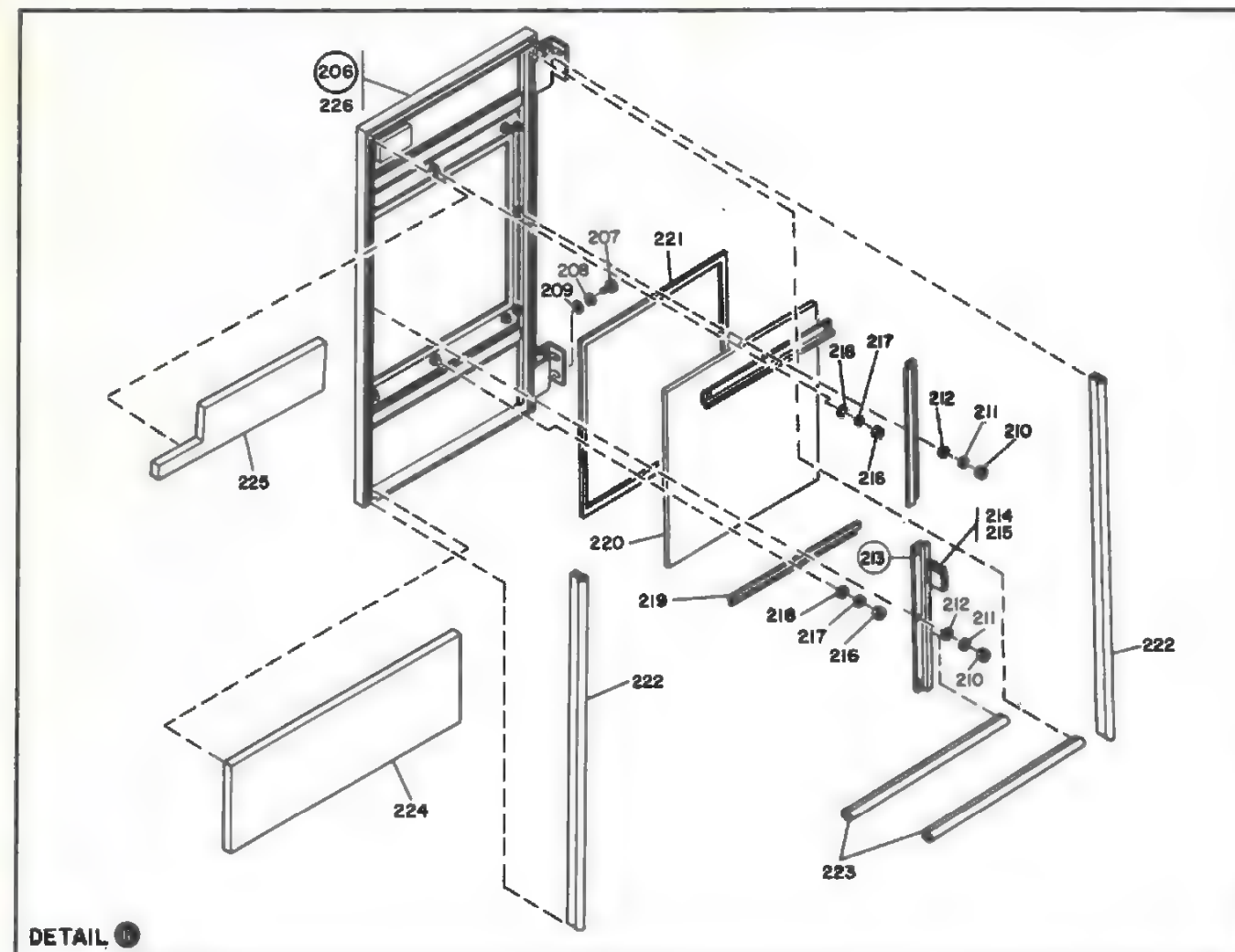


FIGURE 1. FINAL ASSEMBLY. SHEET 5 OF 5. INDEX NOS. 206-246. SEE LIST 1.

# FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | 1 2 3 4 | DESCRIPTION                            |
|----------------------------|----------------|----------------------|---------|--|
| 1 -206                     | 4138353        | 1                    |         | DOOR ASM                               |
| -207                       | 130434         | 4                    |         | SCREW, SLOTTED HEX HD 10-32 X 0.375 LG |
| -208                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -209                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -210                       | 11596          | 3                    |         | NUT, HEX- 10-32                        |
| -211                       | 9092           | 3                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -212                       | 45690          | 3                    |         | WASHER, FL- 0.203 ID X 0.438 OD        |
| -213                       | 4138350        | 1                    |         | CLAMP ASM                              |
| -214                       | 113282         | 2                    |         | SCREW                                  |
| -215                       | 848876         | 1                    |         | LATCH ASM, COVER                       |
| -216                       | 11598          | 9                    |         | NUT, HEX- 10-32                        |
| -217                       | 9092           | 9                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -218                       | 45690          | 9                    |         | WASHER, FL- 0.203 ID X 0.438 OD        |
| -219                       | 4138349        | 1                    |         | CLAMP                                  |
| -220                       | 1815113        | 1                    |         | GLASS                                  |
| -221                       | 4138391        | 1                    |         | SPAL                                   |
| -222                       | 2526535        | 1                    |         | SEAL, 72 INCHES LG                     |
| -223                       | 2526535        | 2                    |         | SEAL, 72 INCHES LG                     |
| -224                       | 4138352        | 1                    |         | MAT                                    |
| -225                       | 4138351        | 1                    |         | MAT                                    |
| -226                       | 4138348        | 1                    |         | DOOR                                   |
| -227                       | 5576672        | 1                    |         | COVER ASM, LEFT REAR                   |
| -228                       | 130434         | 2                    |         | SCREW, SLOTTED HEX HD 10-32 X 0.375 LG |
| -229                       | 9092           | 2                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -230                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -231                       | 11598          | 2                    |         | NUT, HEX- 10-32                        |
| -232                       | 9092           | 2                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -233                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -234                       | 4138371        | 1                    |         | BRACKET                                |
| -235                       | 32042          | 2                    |         | SCREW, BD HD- 10-32 X 0.375 LG         |
| -236                       | 4138372        | 1                    |         | BRACKET                                |
| -237                       | 11598          | 2                    |         | NUT, HEX- 10-32                        |
| -238                       | 9092           | 2                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -239                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -240                       | 1819763        | 1                    |         | BRACKET                                |
| -241                       | 11598          | 2                    |         | NUT, HEX- 10-32                        |
| -242                       | 9092           | 2                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD |
| -243                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -244                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD      |
| -245                       | 474405         | 2                    |         | PIN                                    |
| -246                       | 4138355        | 1                    |         | COVER                                  |



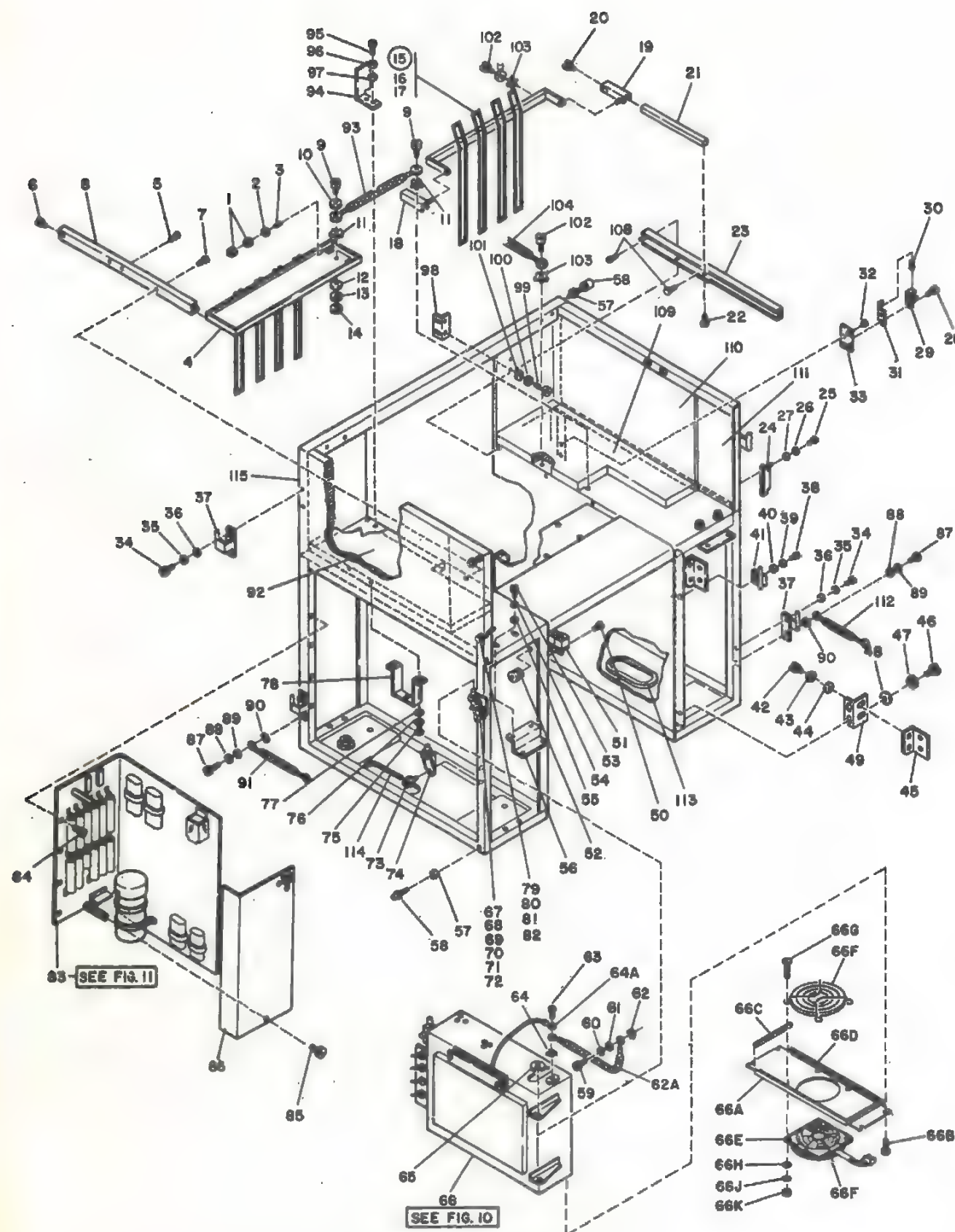


FIGURE 2. LOWER STRUCTURE ASSEMBLY. SHEET 1 OF 2. INDEX NOS. 1-115. SEE LIST 2.

# LOWER STRUCTURE ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |
|----------------------------|----------------|----------------------|--|
| 2 -                        | 1815055        | REF                  | LOWER STRUCTURE ASSEMBLY<br>FOR NEXT HIGHER ASSEMBLY SEE FIGURE 1-115<br>FOR ILLUSTRATION SEE FIGURE 2 |
| - 1                        | 11598          | 4                    | NUT, HEX- 10-32 ATT PT   |
| - 2                        | 324            | 2                    | WASHER, FL- 0.193 ID X 0.750 OD ATT PT   |
| - 3                        | 736860         | 2                    | SPRING   |
| - 4                        | 1819767        | 1                    | FRONT GUIDE ASM  |
| - 5                        | 104763         | 2                    | SCREW, CAP, SOC HD- 10-32 X 1/2 LG ATT PT  |
| - 6                        | 58207          | 2                    | SCREW, BD HD- 8-32 X 0.250 LG ATT PT   |
| - 7                        | 236849         | 3                    | SCREW, BD HD- 10-32 X 0.250 LG ATT PT  |
| - 8                        | 4134996        | 1                    | LEFT GUIDE   |
| - 9                        | 32042          | 2                    | SCREW, BD HD- 10-32 X 0.375 LG   |
| - 10                       | 45690          | 1                    | WASHER, FL- 0.203 ID X 0.438 OD  |
| - 11                       | 56079          | 2                    | LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O  |
| - 12                       | 45690          | 1                    | WASHER, FL- 0.203 ID X 0.438 OD  |
| - 13                       | 9092           | 1                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD   |
| - 14                       | 11598          | 1                    | NUT, HPY- 10-32  |
| - 15                       | 5576616        | 1                    | REAR GUIDE ASM   |
| - 16                       | 222696         | 2                    | BEARING  |
| - 17                       | 4134987        | 1                    | GUIDE  |
| - 18                       | 4134990        | 1                    | LEFT CHANNEL ASM   |
| - 19                       | 4134991        | 1                    | RIGHT CHANNEL ASM  |
| - 20                       | 34512          | 6                    | SCREW, BD HD- 8-32 X 0.375 LG ATT PT   |
| - 21                       | 4134992        | 2                    | RAIL   |
| - 22                       | 236849         | 3                    | SCREW, BD HD- 10-32 X 0.250 LG   |
| - 23                       | 4134995        | 1                    | RIGHT GUIDE  |
| - 24                       | 4138365        | 1                    | BRACKET  |
| - 25                       | 130434         | 2                    | SCREW, SLOTTED HEX HD 10-32 X 0.375 LG ATT PT  |
| - 26                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 27                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 28                       | 833616         | 2                    | STUD   |
| - 29                       | 833618         | 1                    | LATCH  |
| - 30                       | 214038         | 1                    | SPRING   |
| - 31                       | 833617         | 1                    | BRACKET  |
| - 32                       | 236849         | 2                    | SCREW, BD HD- 10-32 X 0.250 LG ATT PT  |
| - 33                       | 853634         | 1                    | PLATE  |
| - 34                       | 130434         | 6                    | SCREW, HEX HD- 10-32 X 0.375 LG ATT PT   |
| - 35                       | 9092           | 6                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 36                       | 1940           | 6                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 37                       | 1819762        | 4                    | HINGE  |
| - 38                       | 130434         | 2                    | SCREW, HEX HD- 10-32 X 0.375 LG ATT PT   |
| - 39                       | 9092           | 2                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 40                       | 1940           | 2                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 41                       | 4135028        | 1                    | STOP   |
| - 42                       | 130434         | 6                    | SCREW, HEX HD- 10-32 X 0.375 LG ATT PT   |
| - 43                       | 9092           | 6                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 44                       | 1940           | 6                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 45                       | 1819771        | 3                    | BRACKET  |
| - 46                       | 130434         | 6                    | SCREW, HEX HD- 10-32 X 0.375 LG ATT PT   |
| - 47                       | 9092           | 6                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 48                       | 1940           | 6                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 49                       | 1819770        | 3                    | BRACKET  |
| - 50                       | 10170          | 2                    | SCREW, BD HD- 6-32 X 0.250 LG ATT PT   |
| - 51                       | 2132050        | 1                    | LATCH  |
| - 52                       | 317227         | 1                    | GRCHMET  |
| - 53                       | 130434         | 3                    | SCREW, HEX HD- 10-32 X 0.375 LG ATT PT   |
| - 54                       | 9092           | 3                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT  |
| - 55                       | 1940           | 3                    | WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT   |
| - 56                       | 4138370        | 1                    | BRACKET  |
| - 57                       | 3960           | 4                    | NUT, HEX- 1/4-20   |
| - 58                       | 255939         | 4                    | SCREW ASM, DOOR  |
| - 59                       | 120211         | 1                    | SCREW, HEX HD- 10-32 X 0.500 LG  |
| - 60                       | 9092           | 1                    | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD   |
| - 61                       | 1940           | 1                    | WASHER, FLAT- 0.192 ID X 0.562 OD  |
| - 62                       | 56079          | 1                    | LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O  |
| - 62A                      | 518611         | 1                    | JUMPER ASM   |
| - 63                       | 34512          | 1                    | SCREW, BD HD- 8-32 X 0.375 LG  |
| - 64                       | 55901          | 1                    | LOCKWASHER, EXT TEETH- 0.176 ID X .381 OD  |
| - 64A                      | 5733161        | 1                    | JUMPER   |
| - 65                       | 251759         | 2                    | RING, RET- 0.480 ID X 0.940 OD ATT PT  |
| - 66                       | 1819740        | 1                    | LOGIC CHASSIS ASSEMBLY<br>FOR DETAIL BREAKDOWN SEE FIGURE 10   |
| - 66A                      | 4135081        | 1                    | PLATE  |
| - 66B                      | 58207          | 2                    | SCREW, BD HD- 8-32 X 0.250 LG ATT PT   |
| - 66C                      | 599557         | 2                    | SEAL   |
| - 66D                      | 599557         | 2                    | SEAL   |
| - 66E                      | 4703241        | 1                    | FAN, 208/230V 50/60HZ AND 220/235V 50/60HZ   |
| - 66F                      | 4703240        | 1                    | FAN, 200V 50/60HZ  |

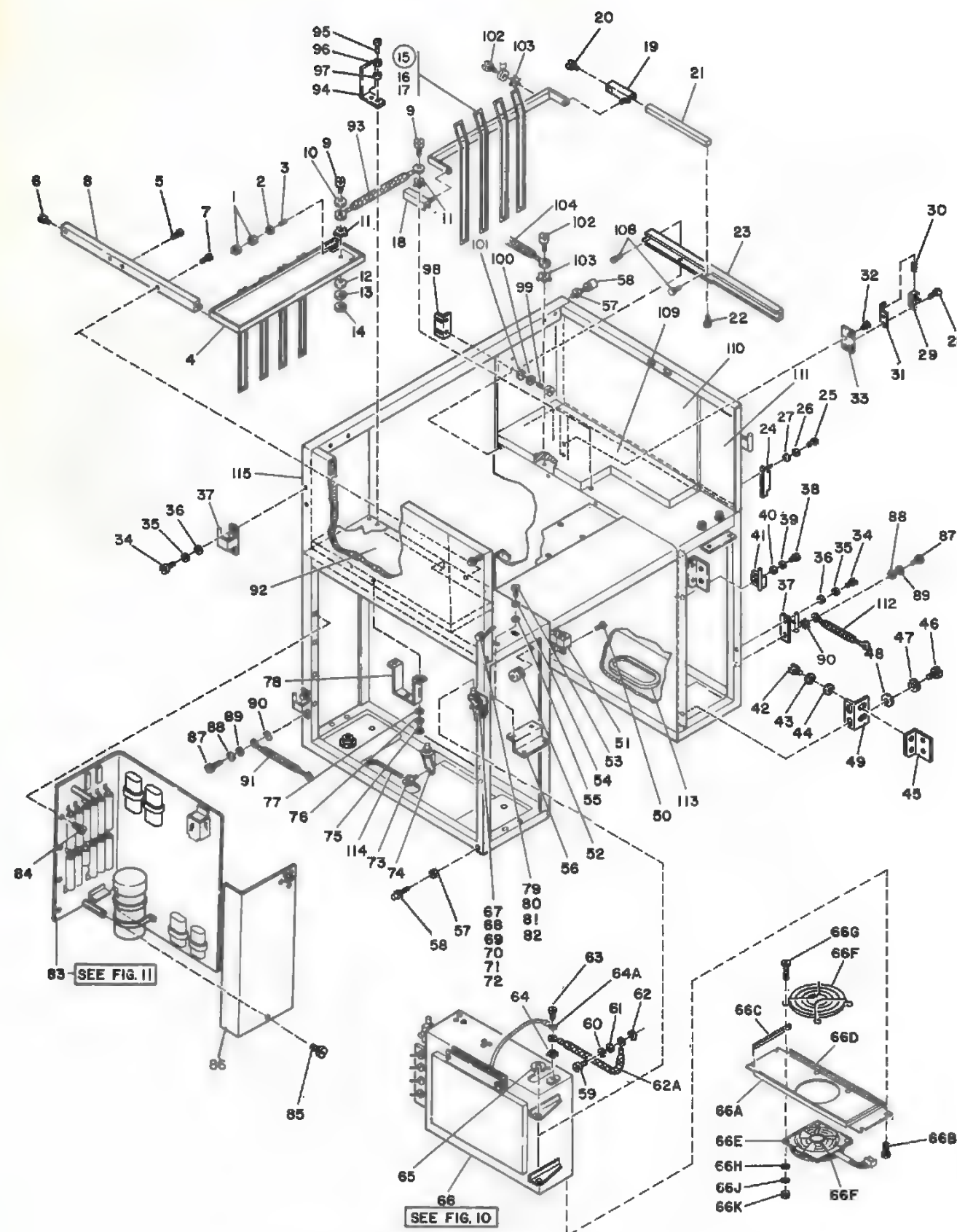


FIGURE 2. LOWER STRUCTURE ASSEMBLY. SHEET 1 OF 2. INDEX NOS. 1-115. SEE LIST 2.

# LOWER STRUCTURE ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | 1 2 3 4 | DESCRIPTION  |
|----------------------------|----------------|----------------------|---------|--|
| 2                          | - 66F 2172166  | 2                    |         | . GUARD  |
|                            | - 66G 322555   | 4                    |         | . SCREW, MACH RH 6-32 X 2-1/4 LG                             |
|                            | - 66H 257986   | 4                    |         | . WASHER, FL- 0.156 ID X 0.312 OD                            |
|                            | - 66J 6364     | 4                    |         | . LOCKWASHER, SPLIT- 0.141 ID X 0.253 OD                     |
|                            | - 66K 257187   | 4                    |         | . NUT, HEX- 6-32   |
|                            | - 67 833616    | 2                    |         | . STUD   |
|                            | - 68 214438    | 1                    |         | . SPRING   |
|                            | - 69 833618    | 1                    |         | . LATCH  |
|                            | - 70 833617    | 1                    |         | . BRACKET  |
|                            | - 71 236849    | 2                    |         | . SCREW, BD HD- 10-32 X 0.250 LG                             |
|                            | - 72 853634    | 1                    |         | . PLATE  |
|                            | - 73 38686     | 4                    |         | . SCREW, HEX HD- 1/4-20 X 0.500 LG ATT PT                    |
|                            | - 74 225532    | 2                    |         | . HINGE ASM  |
|                            | - 75 130434    | 2                    |         | . SCREW, HEX HD- 10-32 X 0.375 LG ATT PT                     |
|                            | - 76 9092      | 2                    |         | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT              |
|                            | - 77 1940      | 2                    |         | . WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT                   |
|                            | - 78 4135083   | 1                    |         | . BRACKET  |
|                            | - 79 130434    | 1                    |         | . SCREW, HEX HD- 10-32 X 0.375 LG ATT PT                     |
|                            | - 80 9092      | 1                    |         | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT              |
|                            | - 81 1940      | 1                    |         | . WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT                   |
|                            | - 82 4138364   | 1                    |         | . BRACKET  |
|                            | - 83 1819731   | 1                    |         | . POWER PLATE ASSEMBLY<br>FOR DETAIL BREAKDOWN SEE FIGURE 11 |
|                            | - 84 32042     | 4                    |         | . SCREW, BD HD- 10-32 X 0.375 LG ATT PT                      |
|                            | - 85 34512     | 2                    |         | . SCREW, BD HD- 8-32 X 0.375 LG                              |
|                            | - 86 1819733   | 1                    |         | . COVER  |
|                            | - 87 120211    | 2                    |         | . SCREW, HEX HD- 10-32 X 0.500 LG                            |
|                            | - 88 9092      | 2                    |         | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD                     |
|                            | - 89 1940      | 2                    |         | . WASHER, FLAT- 0.192 ID X 0.562 OD                          |
|                            | - 90 56079     | 2                    |         | . LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O                  |
|                            | - 91 856575    | 1                    |         | . JUMPER ASM   |
|                            | - 92 4138396   | 1                    |         | . PAD  |
|                            | - 93 523022    | 1                    |         | . JUMPER ASM   |
|                            | - 94 5576637   | 1                    |         | . STRIKE   |
|                            | - 95 130434    | 2                    |         | . SCREW, SLOTTED HEX HD 10-32 X 0.375 LG ATT PT              |
|                            | - 96 9092      | 2                    |         | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD ATT PT              |
|                            | - 97 1940      | 2                    |         | . WASHER, FLAT- 0.192 ID X 0.562 OD ATT PT                   |
|                            | - 98 5593418   | 1                    |         | . BRACKET  |
|                            | - 99 130434    | 2                    |         | . SCREW, SLOTTED HEX HD 10-32 X 0.375 LG                     |
|                            | - 100 9092     | 2                    |         | . LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD                     |
|                            | - 101 28692    | 2                    |         | . WASHER, FLAT- 0.196 ID X 1.00 OD                           |
|                            | - 102 58207    | 2                    |         | . SCREW, BD HD- 8-32 X 0.250 LG                              |
|                            | - 103 55901    | 2                    |         | . LOCKWASHER, EXT TEETH- 0.176 ID X .381 OD                  |
|                            | - 104 676748   | 1                    |         | . JUMPER ASM   |
|                            | - 106 55901    | 1                    |         | . WASHER   |
|                            | - 107 255939   | 1                    |         | . SCREW ASM, DOOR  |
|                            | - 108 236849   | 3                    |         | . SCREW  |
|                            | - 109 4138397  | AR                   |         | . PAD  |
|                            | - 109 5593464  | AR                   |         | . PAD  |
|                            | - 110 4138389  | 1                    |         | . PAD  |
|                            | - 111 5576640  | 2                    |         | . PAD  |
|                            | - 112 856575   | 1                    |         | . JUMPER ASM   |
|                            | - 113 350830   | AR                   |         | . CHANNEL  |
|                            | - 114 350830   | AR                   |         | . CHANNEL  |
|                            | - 115 4138326  | 1                    |         | . FRAME ASM  |



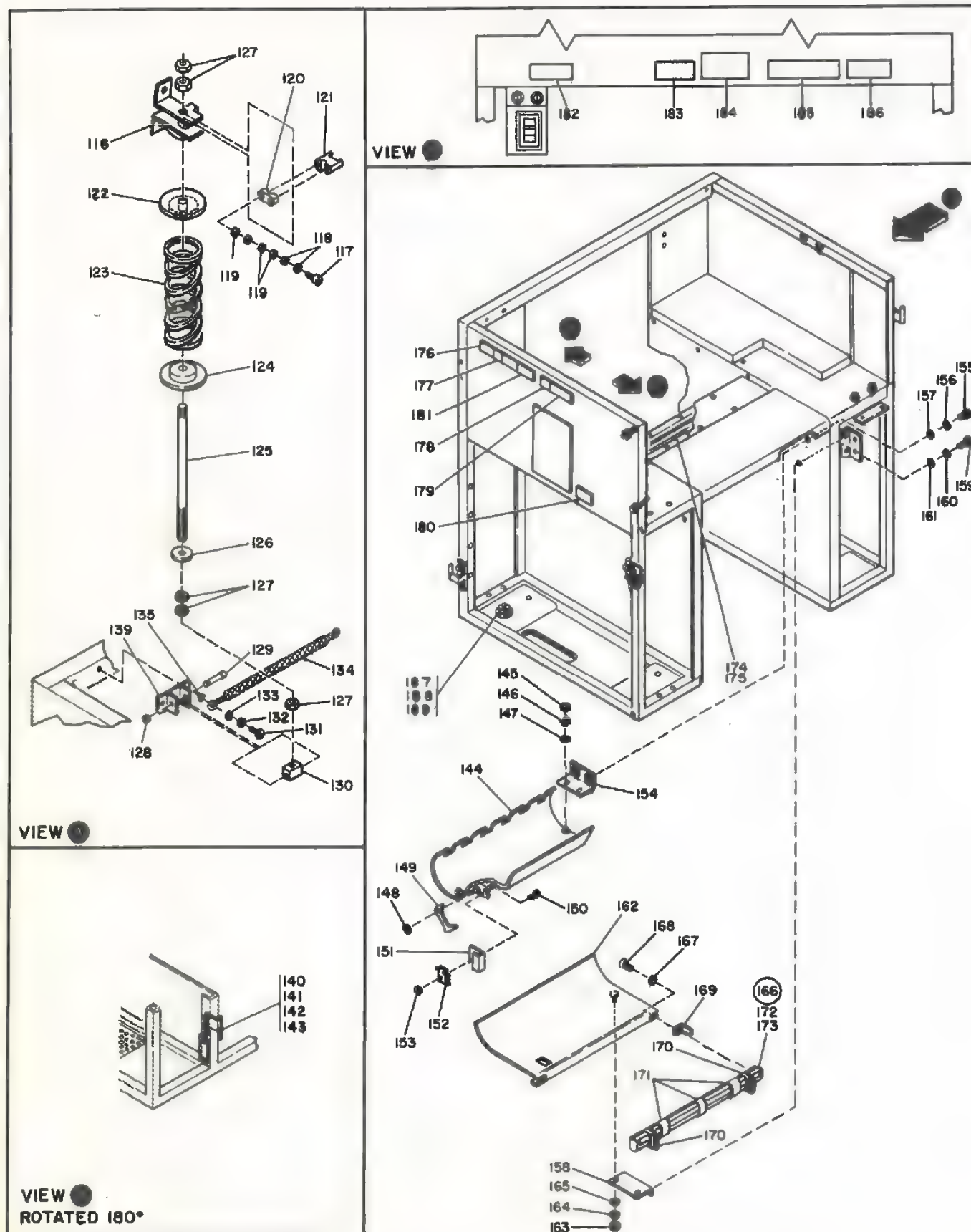


FIGURE 2. LOWER STRUCTURE ASSEMBLY. SHEET 2 OF 2. INDEX NOS. 116-189. SEE LIST 2.

| LOWER STRUCTURE ASSEMBLY   |                |                      |         |   |
|----------------------------|----------------|----------------------|---------|---|
| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | 1 2 3 4 | DESCRIPTION                               |
| 2                          |                |                      |         |   |
| -116                       | 5576635        | 2                    |         | BRACKET                                   |
| -117                       | 332560         | 4                    |         | SCREW, CAP SOC HD- 8-32 X 1.250 LG        |
| -118                       | 45671          | 4                    |         | WASHER                                    |
| -119                       | 4253783        | 4                    |         | WASHER                                    |
| -120                       | 5576626        | 2                    |         | BRAKE                                     |
| -121                       | 5576627        | 2                    |         | BRAKE                                     |
| -122                       | 5576630        | 2                    |         | GUIDE                                     |
| -123                       | 5576629        | 2                    |         | SPRING                                    |
| -124                       | 5576630        | 2                    |         | GUIDE                                     |
| -125                       | 5576631        | 2                    |         | SHAFT                                     |
| -126                       | 154214         | 2                    |         | WASHER, FL 21/64 ID X 1.000 OD X 3/32 THK |
| -127                       | 4564           | 10                   |         | NUT, HEX- 5/16-18                         |
| -128                       | 257982         | 2                    |         | CLIP, RETAINING E-TYPE                    |
| -129                       | 4253332        | 2                    |         | STUD                                      |
| -130                       | 4253789        | 2                    |         | PIVOT BRACKET                             |
| -131                       | 55711          | 4                    |         | SCREW, MACH HEX HD- 10-32 X 0.562 LG      |
| -132                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -133                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -134                       | 253425         | 1                    |         | JUMPER                                    |
| -135                       | 56079          | 1                    |         | LOCKWASHER, EXT TEETH- 0.204 ID X 0.410 O |
| -139                       | 5576633        | 2                    |         | BRACKET                                   |
| -140                       | 130434         | 2                    |         | SCREW, SLOTTED HEX HD 10-32 X 0.375 LG    |
| -141                       | 9092           | 2                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -142                       | 1940           | 2                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -143                       | 4135028        | 1                    |         | STOP                                      |
| -144                       | 1819755        | 1                    |         | GUIDE ASM, UPPER                          |
| -145                       | 11596          | 4                    |         | NUT, HEX- 10-32                           |
| -146                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -147                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -148                       | 1092125        | 1                    |         | CLIP                                      |
| -149                       | 4135067        | 1                    |         | ACTUATOR                                  |
| -150                       | 438544         | 2                    |         | SCREW, BD HD- 4-40 X 1.000 LG             |
| -151                       | 5593433        | 1                    |         | GUARD                                     |
| -152                       | 1589401        | 1                    |         | SWITCH ASM                                |
| -153                       | 47987          | 2                    |         | NUT, HEX- 2-56                            |
| -154                       | 1815109        | 2                    |         | BRACKET, UPPER GUIDE                      |
| -155                       | 120211         | 4                    |         | SCREW, HEX HD- 10-32 X 0.500 LG           |
| -156                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -157                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -158                       | 1815108        | 2                    |         | BRACKET, LOWER GUIDE                      |
| -159                       | 120211         | 4                    |         | SCREW, HEX HD- 10-32 X 0.500 LG           |
| -160                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -161                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -162                       | 1819756        | 1                    |         | GUIDE ASM, LOWER                          |
| -163                       | 11596          | 4                    |         | NUT, HEX- 10-32                           |
| -164                       | 9092           | 4                    |         | LOCKWASHER, SPLIT- 0.194 ID X 0.337 OD    |
| -165                       | 1940           | 4                    |         | WASHER, FLAT- 0.192 ID X 0.562 OD         |
| -166                       | 5593455        | 1                    |         | GUIDE ASM                                 |
| -167                       | 12553          | 2                    |         | WASHER, FL- 0.187 ID X 0.375 X 0.024 THK  |
| -168                       | 1815411        | 2                    |         | SCREW, SHOULDER- 6-32                     |
| -169                       | 1821336        | 2                    |         | STOP                                      |
| -170                       | 1812638        | 2                    |         | GUIDE, FORMS                              |
| -171                       | 1794804        | 3                    |         | CLIP                                      |
| -172                       | 5593454        | 1                    |         | DECAL                                     |
| -173                       | 1815302        | 1                    |         | GUIDE-FORMS ENTRANCE                      |
| -174                       | 1819764        | 1                    |         | CHANNEL                                   |
| -175                       | 38364          | 6                    |         | SCREW SOCKET                              |
| -176                       | 906744         | 1                    |         | PLATE, SERIAL NO.-US/CANADA/UTC           |
| -176                       | 855282         | 1                    |         | PLATE, SERIAL NO.-SWEIEN                  |
| -177                       | 906758         | 1                    |         | PLATE, SERIAL NO.-US/CANADA/UTC           |
| -177                       | 855283         | 1                    |         | PLATE, SERIAL NO.-SWEIEN                  |
| -178                       | 842555         | 1                    |         | PLATE-UL APPROVAL                         |
| -178                       | 842556         | 1                    |         | PLATE-UL APPROVAL                         |
| -178                       | 855286         | 1                    |         | PLATE-UL APPROVAL                         |
| -178                       | 960766         | 1                    |         | PLATE-CSA APPROVAL                        |
| -179                       | 6808548        | 1                    |         | PLATE-POWER RATE- 60 HZ                   |
| -179                       | 6808543        | 1                    |         | PLATE-POWER RATE- 60 HZ                   |
| -179                       | 6808542        | 1                    |         | PLATE-POWER RATE- 50 HZ                   |
| -180                       | 369207         | 1                    |         | LABEL-VOLTAGE                             |
| -181                       | 960748         | 1                    |         | PLATE-PROPERTY OF USA                     |
| -181                       | 855263         | 1                    |         | PLATE-PROPERTY OF USA/UTC                 |
| -181                       | 960746         | 1                    |         | PLATE-PROPERTY OF CANADA                  |
| -181                       | 960740         | 1                    |         | PLATE-MFD BY CANADA                       |
| -181                       | 911932         | 1                    |         | PLATE-MFD IN CANADA                       |
| -181                       | 960742         | 1                    |         | PLATE-RECONDITIONED IN CANADA             |
| -181                       | 960752         | 1                    |         | PLATE-RECONDITIONED IN CANADA             |



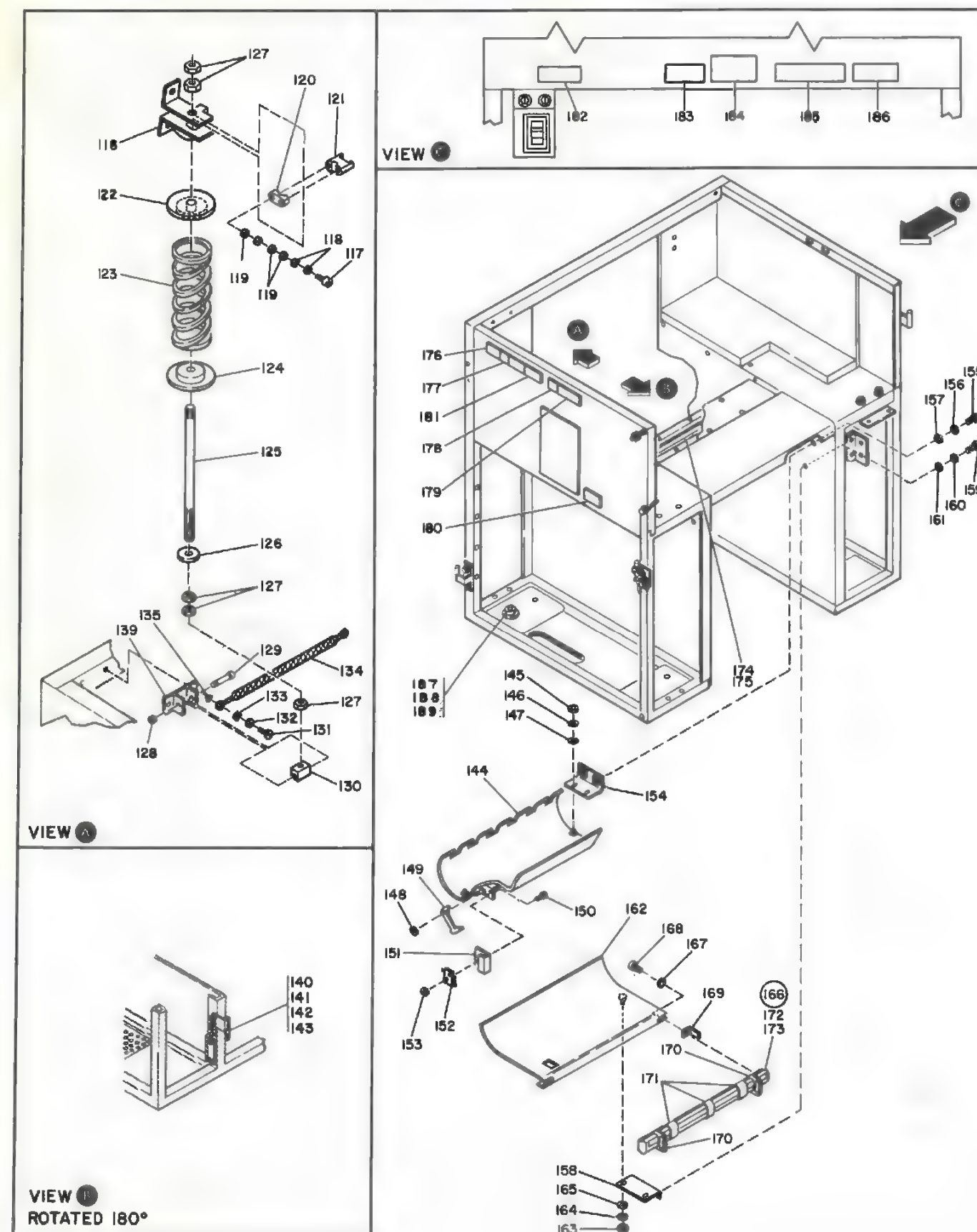


FIGURE 2. LOWER STRUCTURE ASSEMBLY. SHEET 2 OF 2. INDEX NOS. 116-189. SEE LIST 2.

LOWER STRUCTURE ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | 1 | 2 | 3 | 4 | DESCRIPTION                    |
|----------------------------|----------------|----------------------|---|---|---|---|--------------------------------|
| 2                          | -181           | 5054292              | 1 |   |   |   | PLATE-RENOVATED FOR CANADA     |
|                            | -181           | 4134350              | 1 |   |   |   | PLATES-WTC PROPERTY            |
|                            | -181           | 5054480              | 1 |   |   |   | PLATE-MFD BY WTC               |
|                            | -181           | 5054484              | 1 |   |   |   | PLATE-MFD FOR WTC              |
|                            | -181           | 5054466              | 1 |   |   |   | PLATE-RECONDITIONED BY WTC     |
|                            | -181           | 5054492              | 1 |   |   |   | PLATE-RECONDITIONED FOR WTC    |
|                            | -181           | 5054496              | 1 |   |   |   | PLATE-RENOVATED BY WTC         |
|                            | -181           | 5054290              | 1 |   |   |   | PLATE-RENOVATED FOR WTC        |
|                            | -181           | 5054476              | 1 |   |   |   | PLATE-PROPERTY OF SWEDEN       |
|                            | -181           | 5054482              | 1 |   |   |   | PLATE-MFD BY SWEDEN            |
|                            | -181           | 5054490              | 1 |   |   |   | PLATE-RECONDITIONED BY SWEDEN  |
|                            | -181           | 5054494              | 1 |   |   |   | PLATE-RECONDITIONED FOR SWEDEN |
|                            | -181           | 5054498              | 1 |   |   |   | PLATE-RENOVATED BY SWEDEN      |
|                            | -181           | 5054294              | 1 |   |   |   | PLATE-MFG EXPORT               |
|                            | -181           | 5054296              | 1 |   |   |   | PLATE-MFG IMPORT               |
|                            | -181           | 902075               | 1 |   |   |   | PLATE-REGISTRATION             |
|                            | -181           | 960856               | 1 |   |   |   | PLATE-REGISTRATION             |
|                            | -182           | 845762               | 1 |   |   |   | LABEL                          |
|                            | -183           | 369207               | 1 |   |   |   | LABEL                          |
|                            | -184           | 2582954              | 1 |   |   |   | LABEL                          |
|                            | -185           | 6808596              | 1 |   |   |   | LABEL                          |
|                            | -186           | 138755               | 1 |   |   |   | LABEL                          |
|                            | -187           | 209567               | 4 |   |   |   | CASTER                         |
|                            | -188           | 186950               | 4 |   |   |   | NUT, HEX 8-32                  |
|                            | -189           | 130987               | 4 |   |   |   | LOCKWASHER                     |

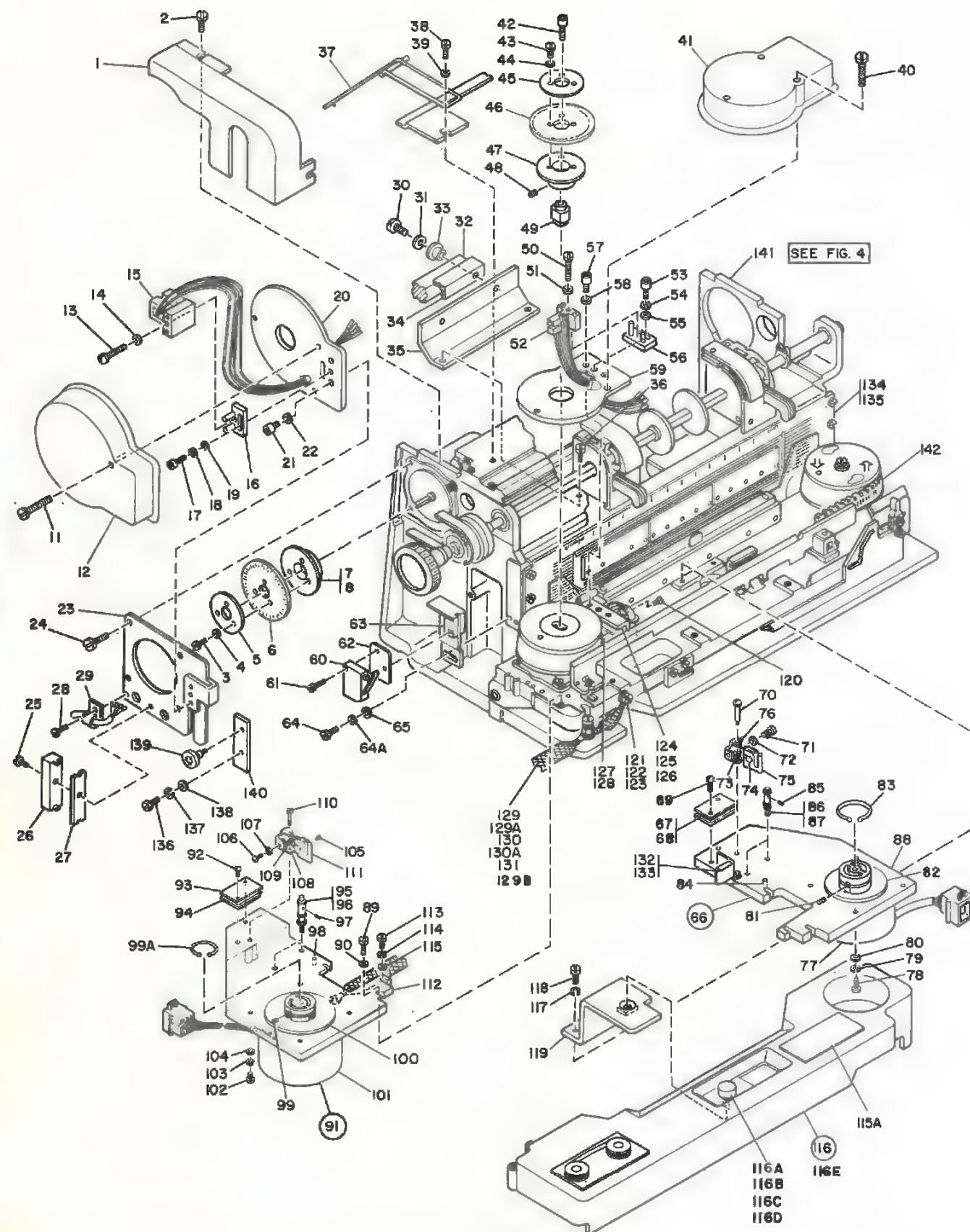


FIGURE 3. MECHANISM FINAL ASSEMBLY. SEE LIST 3.

# MECHANISM FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION   |
|----------------------------|----------------|----------------------|---|
| 3 -                        | 1808563        | REF                  | MECHANISM FINAL ASSEMBLY MODEL 1<br>FOR NEXT HIGHER ASM SEE FIGURE 1-4<br>FOR ILLUSTRATION SEE FIGURE 3 |
| -                          | 1808564        | REF                  | MECHANISM FINAL ASSEMBLY MODEL 2<br>FOR NEXT HIGHER ASM SEE FIGURE 1-4<br>FOR ILLUSTRATION SEE FIGURE 3 |
| - 1                        | 4135092        | 1                    | COVER   |
| - 2                        | 5528           | 1                    | SCREW, BD HD- 8-32 X 0.625 LG   |
| - 3                        | 438536         | 3                    | SCREW, BIND HD- 2-56 X 0.250 LG   |
| - 4                        | 257985         | 1                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 5                        | 4135096        | 1                    | STIFFENER, DISC   |
| - 6                        | 4703234        | 1                    | DISC, NEW STYLE   |
| - 7                        | 195            | 1                    | SETScrew, 6 FLUTE 10-32 X 1.875 LG  |
| - 8                        | 4135072        | 1                    | COLLAR  |
| - 11                       | 4703261        | 3                    | SCREW   |
| - 12                       | 5576611        | 1                    | COVER ASM- BELT   |
| - 13                       | 438552         | 1                    | SCREW, MACH BD HD- 4-40 X 0.750 LG  |
| - 14                       | 257985         | 1                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 15                       | 6808527        | 1                    | TRANSDUCER ASSEMBLY   |
| - 16                       | 4135089        | 1                    | BLOCK ASM   |
| - 17                       | 186924         | 1                    | SCREW, CAP, SOC HD, FLUTED-4-40 X 0.375 LG  |
| - 18                       | 257984         | 1                    | LOCKWASHER, SPLIT- 0.115 ID X 0.212 OD  |
| - 19                       | 257985         | 1                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 20                       | 5576606        | 1                    | SUPPORT   |
| - 21                       | 1072433        | 2                    | SCREW, CAP SOC 8-32 X 1/4 LG  |
| - 22                       | 22478          | 2                    | WASHER, FL- 0.170 ID X 0.375 OD   |
| - 23                       | 5576639        | 1                    | BRACKET   |
| - 24                       | 55198          | 4                    | SCREW   |
| - 25                       | 438549         | 1                    | SCREW, BD HD- 4-40 X 0.437 LG   |
| - 26                       | 302090         | 1                    | BLOCK, TERMINAL   |
| - 27                       | 302131         | 1                    | STRIP, INSULATOR 2.094 LG   |
| - 28                       | 58207          | 1                    | SCREW, BD HD- 8-32 X 0.250 LG   |
| - 29                       | 2102364        | 1                    | CLAMP, LOOP- 0.22 ID X 0.17 DIA MTG HOLE  |
| - 30                       | 322551         | 2                    | SCREW, BD HD- 6-32 X 0.750 LG   |
| - 31                       | 307286         | 2                    | SPACER  |
| - 32                       | 642571         | 1                    | BAR   |
| - 33                       | 642597         | 2                    | BUSHING   |
| - 34                       | 642598         | 1                    | INSULATOR   |
| - 35                       | 4135085        | 1                    | BRACKET   |
| - 36                       | 10170          | 2                    | SCREW, BD HD- 6-32 X 0.250 LG   |
| - 37                       | 1815105        | 1                    | GUIDE, UPPER  |
| - 38                       | 34512          | 2                    | SCREW, BD HD- 8-32 X 0.375 LG   |
| - 39                       | 22478          | 2                    | WASHER, FL- 0.170 ID X 0.375 OD   |
| - 40                       | 5257443        | 3                    | SCREW   |
| - 41                       | 5576611        | 1                    | COVER ASM- BELT   |
| - 42                       | 332560         | 1                    | SCREW, CAP SOC HD- 8-32 X 1.250 LG  |
| - 43                       | 438538         | 1                    | SCREW, BD HD- 2-56 X 0.250 LG   |
| - 44                       | 257985         | 3                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 45                       | 4135096        | 1                    | STIFFENER, DISC   |
| - 46                       | 4135073        | 1                    | DISC  |
| - 47                       | 4135072        | 1                    | COLLAR  |
| - 48                       | 195            | 1                    | SETScrew, 6 FLUTE 10-32 X 1.875 LG  |
| - 49                       | 5576607        | 1                    | HUB, EMITTER  |
| - 50                       | 438552         | 1                    | SCREW   |
| - 51                       | 257985         | 1                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 52                       | 6808527        | 1                    | TRANSDUCER ASSEMBLY   |
| - 53                       | 186924         | 1                    | SCREW, CAP, SOC HD, FLUTED-4-40 X 0.375 LG  |
| - 54                       | 257984         | 1                    | LOCKWASHER, SPLIT- 0.115 ID X 0.212 OD  |
| - 55                       | 257985         | 1                    | WASHER, PLAIN- 0.125 ID X 0.250 OD  |
| - 56                       | 4135089        | 1                    | BLOCK ASM   |
| - 57                       | 1072433        | 2                    | SCREW, CAP SOC 8-32 X 1/4 LG  |
| - 58                       | 22478          | 2                    | WASHER, FL- 0.170 ID X 0.375 OD   |
| - 59                       | 5576606        | 1                    | SUPPORT   |
| - 60                       | 5616034        | 1                    | SWITCH  |
| - 61                       | 438550         | 2                    | SCREW, BD HD- 4-40 X 0.500 LG   |
| - 62                       | 5312656        | 1                    | SHIELD, SWITCH  |
| - 63                       | 5576667        | 1                    | BRACKET, SWITCH MTG   |
| - 64                       | 104613         | 2                    | SCREW, HEX SOC HD- 8-32 X 0.500 LG  |
| - 64A                      | 1090873        | 2                    | LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD  |
| - 65                       | 22478          | 2                    | WASHER, FL- 0.170 ID X 0.375 OD   |
| - 66                       | 1815070        | 1                    | RIBBON DRIVE ASM- RIGHT   |
| - 67                       | 5576617        | 1                    | SWITCH  |
| - 68                       | 749515         | 2                    | INSULATOR   |
| - 69                       | 52523          | 2                    | SCREW   |
| - 70                       | 749513         | 1                    | STUD  |
| - 71                       | 35739          | 1                    | SCREW   |
| - 72                       | 257187         | 2                    | NUT   |







## MECHANISM FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                                    |
|----------------------------|----------------|----------------------|--|
|                            |                |                      | 1 2 3 4  |
| 3 -135                     | 186758         | 4                    | . SCREW,BD HD- 8-32 X 0.437 LG ATT PT          |
| -136                       | 130434         | 1                    | . SCREW,SLOTTED HEX HD 10-32 X 0.375 LG        |
| -137                       | 9092           | 1                    | . LOCKWASHER,SPLIT- 0.194 ID X 0.337 OD ATT PT |
| -139                       | 5576646        | 1                    | . BEARING                                      |
| -140                       | 5576644        | 1                    | . SLIDE  |
| -141                       | 1794573        | 1                    | . BASIC MECHANISM ASM                          |
|                            |                |                      | FOR DETAIL BREAKDOWN SEE FIGURE 4              |
| -142                       | 1794986        | 1                    | . BELT,US-CANADA,48 CHAR SET,.079 HI           |
| -142                       | 1794987        | 1                    | . BELT,US-CANADA,64 CHAR SET,.079 HI -EBCDIC   |
| -142                       | 1794988        | 1                    | . BELT,US-CANADA,64 CHAR SET,.079 HI -ASCII    |
| -142                       | 1795023        | 1                    | . BELT,US-CANADA,38 CHAR SET,.095 HI           |
| -142                       | 1795022        | 1                    | . BELT,US-CANADA,42 CHAR SET,.095 HI           |
| -142                       | 1755244        | 1                    | . BELT,US-CANADA,48 CHAR SET,.095 HI           |
| -142                       | 1794622        | 1                    | . BELT,US-CANADA,64 CHAR SET,.095 HI           |
| -142                       | 1794623        | 1                    | . BELT,US-CANADA,96 CHAR SET,.095 HI           |
| -142                       | 1794975        | 1                    | . BELT,CANADA-FRANCE,48 CHAR SET,.079 HI       |
| -142                       | 1794976        | 1                    | . BELT,CANADA-FRANCE,64 CHAR SET,.079 HI       |
| -142                       | 1795208        | 1                    | . BELT,CANADA-FRANCE,48 CHAR SET,.095 HI       |
| -142                       | 1794624        | 1                    | . BELT,CANADA-FRANCE,64 CHAR SET,.095 HI       |
| -142                       | 1794625        | 1                    | . BELT,CANADA-FRANCE,96 CHAR SET,.095 HI       |
| -142                       | 1794688        | 1                    | . BELT,FRANCE,48 CHAR SET,.079 HI              |
| -142                       | 1794693        | 1                    | . BELT,FRANCE,64 CHAR SET,.079 HI              |
| -142                       | 1795208        | 1                    | . BELT,FRANCE,48 CHAR SET,.095 HI              |
| -142                       | 1794879        | 1                    | . BELT,FRANCE,64 CHAR SET,.095 HI              |
| -142                       | 1794880        | 1                    | . BELT,FRANCE,96 CHAR SET,.095 HI              |
| -142                       | 1794912        | 1                    | . BELT,SPAIN,48 CHAR SET,.079 HI               |
| -142                       | 1794914        | 1                    | . BELT,SPAIN,64 CHAR SET,.079 HI               |
| -142                       | 1795160        | 1                    | . BELT,SPAIN,48 CHAR SET,.095 HI               |
| -142                       | 1794889        | 1                    | . BELT,SPAIN,64 CHAR SET,.095 HI               |
| -142                       | 1794890        | 1                    | . BELT,SPAIN,96 CHAR SET,.095 HI               |
| -142                       | 1794971        | 1                    | . BELT,SPANISH SPEAKING,48 CHAR SET,.079 HI    |
| -142                       | 1794972        | 1                    | . BELT,SPANISH SPEAKING,64 CHAR SET,.079 HI    |
| -142                       | 1795163        | 1                    | . BELT,SPANISH SPEAKING,48 CHAR SET,.095 HI    |
| -142                       | 1794915        | 1                    | . BELT,SPANISH SPEAKING,64 CHAR SET,.095 HI    |
| -142                       | 1794916        | 1                    | . BELT,SPANISH SPEAKING,96 CHAR SET,.095 HI    |
| -142                       | 1794697        | 1                    | . BELT,ITALY,48 CHAR SET,.079 HI               |
| -142                       | 1794836        | 1                    | . BELT,ITALY,64 CHAR SET,.079 HI               |
| -142                       | 1795210        | 1                    | . BELT,ITALY,48 CHAR SET,.095 HI               |
| -142                       | 1794881        | 1                    | . BELT,ITALY,64 CHAR SET,.095 HI               |
| -142                       | 1794882        | 1                    | . BELT,ITALY,96 CHAR SET,.095 HI               |
| -142                       | 1794703        | 1                    | . BELT,AUSTRIA-GERMANY,48 CHAR SET,.079 HI     |
| -142                       | 1794695        | 1                    | . BELT,AUSTRIA-GERMANY,52 CHAR SET,.079 HI     |
| -142                       | 1794917        | 1                    | . BELT,AUSTRIA-GERMANY,64 CHAR SET,.079 HI     |
| -142                       | 1794918        | 1                    | . BELT,AUSTRIA-GERMANY,64 CHAR SET,.079 HI     |
| -142                       | 1795124        | 1                    | . BELT,AUSTRIA-GERMANY,48 CHAR SET,.095 HI     |
| -142                       | 1795030        | 1                    | . BELT,AUSTRIA-GERMANY,52 CHAR SET,.095 HI     |
| -142                       | 1794626        | 1                    | . BELT,AUSTRIA-GERMANY,64 CHAR SET,.095 HI     |
| -142                       | 1794670        | 1                    | . BELT,AUSTRIA-GERMANY,96 CHAR SET,.095 HI     |
| -142                       | 1794929        | 1                    | . BELT,UNITED KINGDOM,48 CHAR SET,.079 HI      |
| -142                       | 1794930        | 1                    | . BELT,UNITED KINGDOM,64 CHAR SET,.079 HI      |
| -142                       | 1795131        | 1                    | . BELT,UNITED KINGDOM,48 CHAR SET,.095 HI      |
| -142                       | 1794962        | 1                    | . BELT,UNITED KINGDOM,64 CHAR SET,.095 HI      |
| -142                       | 1794963        | 1                    | . BELT,UNITED KINGDOM,96 CHAR SET,.095 HI      |
| -142                       | 1794935        | 1                    | . BELT,DENMARK-NORWAY,48 CHAR SET,.079 HI      |
| -142                       | 1794937        | 1                    | . BELT,DENMARK-NORWAY,64 CHAR SET,.079 HI      |
| -142                       | 1795154        | 1                    | . BELT,DENMARK-NORWAY,48 CHAR SET,.095 HI      |
| -142                       | 1794820        | 1                    | . BELT,DENMARK-NORWAY,64 CHAR SET,.095 HI      |
| -142                       | 1794876        | 1                    | . BELT,DENMARK-NORWAY,96 CHAR SET,.095 HI      |
| -142                       | 1794939        | 1                    | . BELT,FINLAND-SWEDEN 48 CHAR SET,.079 HI      |
| -142                       | 1795060        | 1                    | . BELT,FINLAND-SWEDEN 64 CHAR SET,.079 HI      |
| -142                       | 1795157        | 1                    | . BELT,FINLAND-SWEDEN 48 CHAR SET,.095 HI      |
| -142                       | 1794877        | 1                    | . BELT,FINLAND-SWEDEN 64 CHAR SET,.095 HI      |
| -142                       | 1794878        | 1                    | . BELT,FINLAND-SWEDEN 96 CHAR SET,.095 HI      |
| -142                       | 1794927        | 1                    | . BELT,BELGIUM,48 CHAR SET,.079 HI             |
| -142                       | 1794933        | 1                    | . BELT,BELGIUM,64 CHAR SET,.079 HI             |
| -142                       | 1795208        | 1                    | . BELT,BELGIUM,48 CHAR SET,.095 HI             |
| -142                       | 1794671        | 1                    | . BELT,BELGIUM,64 CHAR SET,.095 HI             |
| -142                       | 1794672        | 1                    | . BELT,BELGIUM,96 CHAR SET,.095 HI             |
| -142                       | 1794908        | 1                    | . BELT,PORTUGAL,48 CHAR SET,.079 HI            |
| -142                       | 1794910        | 1                    | . BELT,PORTUGAL,64 CHAR SET,.079 HI            |
| -142                       | 1795139        | 1                    | . BELT,PORTUGAL,48 CHAR SET,.095 HI            |
| -142                       | 1794887        | 1                    | . BELT,PORTUGAL,64 CHAR SET,.095 HI            |
| -142                       | 1794888        | 1                    | . BELT,PORTUGAL,96 CHAR SET,.095 HI            |
| -142                       | 1803802        | 1                    | . BELT,INTERNATIONAL,48 CHAR SET,.095 HI       |
| -142                       | 1794952        | 1                    | . BELT,INTERNATIONAL,64 CHAR SET,.095 HI       |
| -142                       | 1794955        | 1                    | . BELT,INTERNATIONAL,96 CHAR SET,.095 HI       |
| -142                       | 1794979        | 1                    | . BELT,JAPAN,48 CHAR SET,.079 HI               |

## MECHANISM FINAL ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                                |
|----------------------------|----------------|----------------------|--|
|                            |                |                      | 1 2 3 4                                    |
| 3 -142                     | 1794985        | 1                    | . BELT,JAPAN,64 CHAR SET,.079 HI           |
| -142                       | 1795172        | 1                    | . BELT,JAPAN,48 CHAR SET,.095 HI           |
| -142                       | 1794883        | 1                    | . BELT,JAPAN,64 CHAR SET,.095 HI           |
| -142                       | 1794886        | 1                    | . BELT,JAPAN-KATAKANA,96 CHAR SET,.095 HI  |
| -142                       | 1795106        | 1                    | . BELT,JAPAN-KATAKANA,120 CHAR SET,.095 HI |

OPERATOR PANEL ASSEMBLY

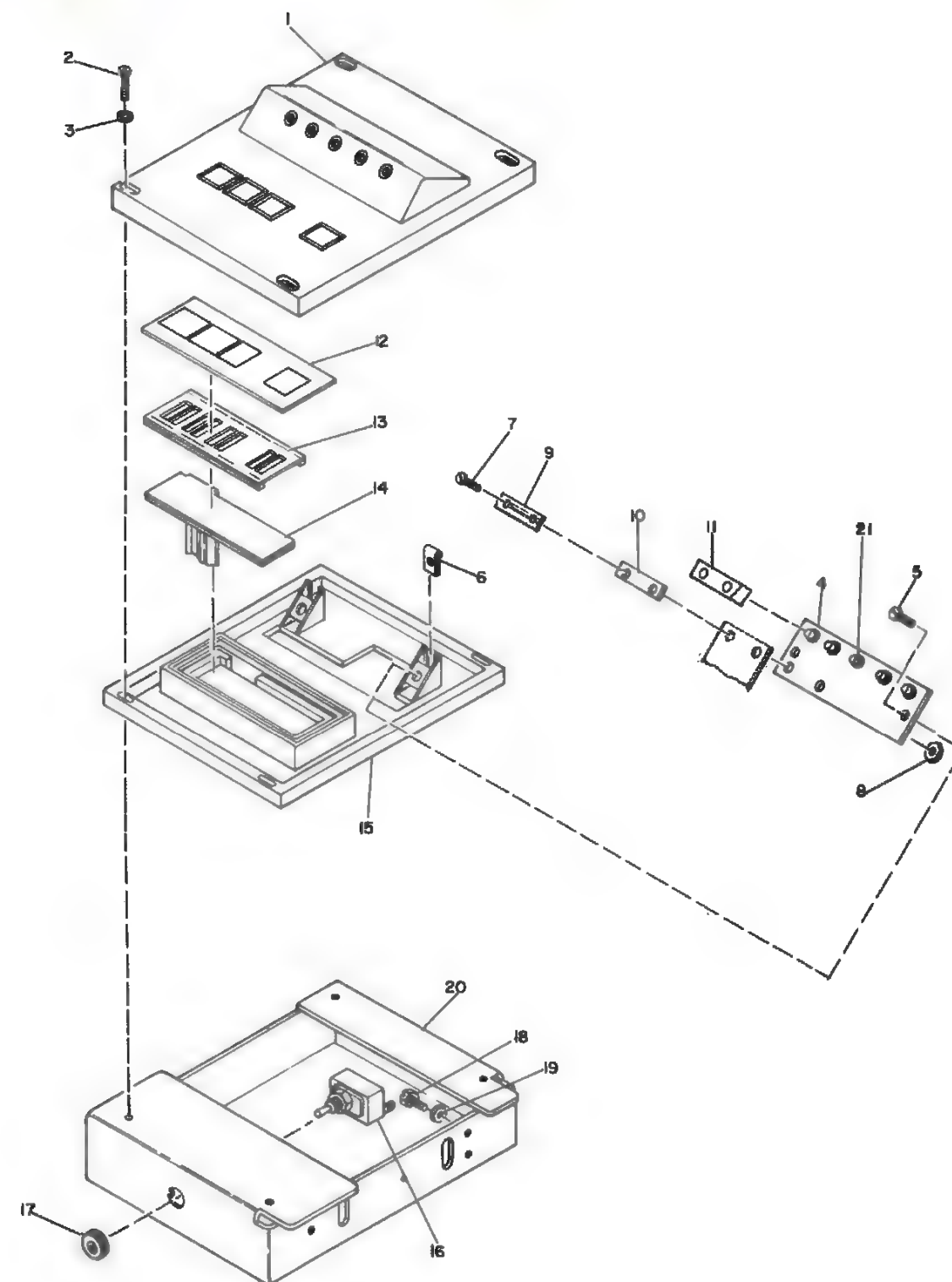


FIGURE 3A. OPERATOR PANEL ASSEMBLY. SEE LIST 3A.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION   |
|----------------------------|----------------|----------------------|---|
| 3A-                        | 5593446        | REF                  | OPERATOR PANEL ASSEMBLY<br>FOR NEXT HIGHER ASM SEE FIGURE 1-12<br>FOR ILLUSTRATION SEE FIGURE 3 |
| - 1                        | 4703212        | 1                    | COVER ASM, ENGLISH  |
| - 1                        | 4703273        | 1                    | COVER ASM, SPANISH  |
| - 1                        | 4703271        | 1                    | COVER ASM, FRENCH CANADIAN  |
| - 1                        | 4703270        | 1                    | COVER ASM, GERMAN   |
| - 1                        | 4703273        | 1                    | COVER ASM, ITALIAN  |
| - 2                        | 322551         | 4                    | SCREW, BD HD- 6-32 X 0.750 LG   |
| - 3                        | 257986         | 4                    | WASHER, FL- 0.156 ID X 0.312 OD   |
| - 4                        | 5593440        | 1                    | PANEL, TOUCH SENSE 1PI  |
| - 5                        | 38235          | 2                    | SCREW, BD HD- 6-32 X 0.312 LG   |
| - 6                        | 2154720        | 2                    | CLIP  |
| - 7                        | 338238         | 2                    | SCREW, BD HD- 4-40 X 0.312 LG   |
| - 8                        | 37913          | 2                    | NUT, HEX- 0.375-16  |
| - 9                        | 4135025        | 1                    | PLATE, PC BOARD CONTACT   |
| - 10                       | 4135026        | 1                    | SPACER  |
| - 11                       | 5593459        | 1                    | SEAL  |
| - 12                       | 5593434        | 1                    | OVERLAY, ENGLISH  |
| - 12                       | 4703267        | 1                    | OVERLAY, SPANISH  |
| - 12                       | 4703269        | 1                    | OVERLAY, FRENCH CANADIAN  |
| - 12                       | 4703266        | 1                    | OVERLAY, GERMAN   |
| - 12                       | 4703268        | 1                    | OVERLAY, ITALIAN  |
| - 13                       | 5593435        | 1                    | UNDERLAY  |
| - 14                       | 5593436        | 1                    | SWITCH ASM, DIAHRAGE  |
| - 15                       | 5593441        | 1                    | HOUSING, GRID SUPPORT   |
| - 16                       | 738826         | 1                    | SWITCH  |
| - 17                       | 216323         | 1                    | NUT, DRESS-0.469-32   |
| - 18                       | 55711          | 3                    | SCREW, MACH HEX HD- 10-32 X 0.562 LG  |
| - 19                       | 11598          | 3                    | NUT, HEX- 10-32   |
| - 20                       | 5593443        | 1                    | BRACKET, OPERATOR PANEL   |
| - 21                       | 6808586        | 1                    | LED, RED  |
| - 21                       | 6808587        | 1                    | LED, GREEN  |
| - 21                       | 6808588        | 3                    | LED, YELLOW   |

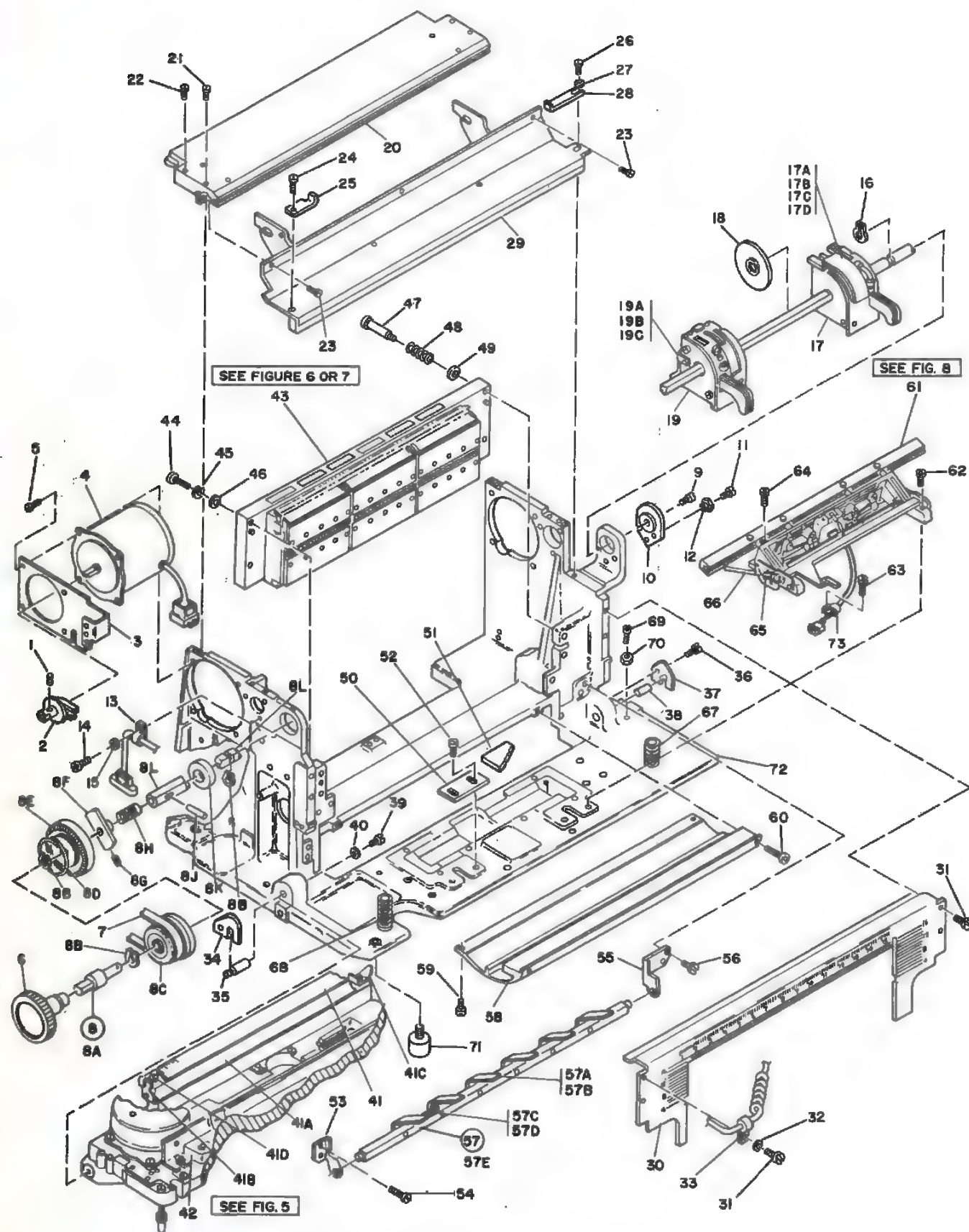


FIGURE 4. BASIC MECHANISM ASSEMBLY. SEE LIST 4.

# BASIC MECHANISM ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION   |   |   |        |
|----------------------------|----------------|----------------------|---|---|---|--------|
|                            |                |                      | 1   | 2 | 3 | 4      |
| 4 -                        | 1794573        | REF                  | BASIC MECHANISM ASSEMBLY<br>FOR NEXT HIGHER ASM SEE FIGURE 3-141<br>FOR ILLUSTRATION SEE FIGURE 4 |   |   |        |
| - 1                        | 123780         | 1                    | SCREW, 6 FLU- 10-32 X 0.188 LG  |   |   |        |
| - 2                        | 4703236        | 1                    | PULLEY ASM, 15 TEETH-NEW STYLE  |   |   |        |
| - 3                        | 5576639        | 4                    | BRACKET   |   |   |        |
| - 4                        | 4703237        | 1                    | MOTOR ASM, NEW STYLE  |   |   |        |
| - 5                        | 55918          | 4                    | SCREW, BD HD- 10-32 X 0.625 LG  |   |   | ATT PT |
| - 6                        | 1814637        | 1                    | KNCB ASSEMBLY   |   |   |        |
| - 7                        | 366291         | 1                    | BELT, TIMING- 75 TEETH  |   |   |        |
| - 8                        | 1794532        | 1                    | CLUTCH ASSEMBLY, SINGLE FIED  |   |   |        |
| - 8A                       | 1815361        | 1                    | ROD   |   |   |        |
| - 8B                       | 839379         | 3                    | RING, RETAINER- 0.460 ID  |   |   |        |
| - 8C                       | 1812646        | 1                    | GEAR, DRIVE   |   |   |        |
| - 8D                       | 1802014        | 1                    | RING, RETAINER  |   |   |        |
| - 8E                       | 1812645        | 1                    | CLUTCH  |   |   |        |
| - 8F                       | 1812643        | 1                    | DRIVER, CLUTCH  |   |   |        |
| - 8G                       | 257974         | 1                    | SETSCREW, FLU- 6-32 X 0.375 LG  |   |   |        |
| - 8H                       | 1812291        | 1                    | SPRING, COMPRESSION   |   |   |        |
| - 8J                       | 1815380        | 1                    | PIN, DOWEL  |   |   |        |
| - 8K                       | 156231         | 1                    | BEARING, BALL- 0.500 ID X 1.125 OD  |   |   |        |
| - 8L                       | 1812306        | 1                    | SHAFT, DRIVE  |   |   |        |
| - 9                        | 35739          | 2                    | SCREW, BD HD- 6-32 X 0.438 LG   |   |   | ATT PT |
| - 10                       | 1814634        | 1                    | BEARING ASM   |   |   |        |
| - 11                       | 322065         | 1                    | SCREW, BD HD- 6-32 X 0.625 LG   |   |   | ATT PT |
| - 12                       | 1814601        | 1                    | ECCENTRIC   |   |   |        |
| - 13                       | 5213276        | 1                    | CLAMP   |   |   | ATT PT |
| - 14                       | 81693          | 1                    | SCREW, BD HD- 6-32 X 0.375 LG   |   |   | ATT PT |
| - 15                       | 22478          | 1                    | WASHER, FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 16                       | 839379         | 1                    | RING, RETAINER- 0.460 ID  |   |   | ATT PT |
| - 17                       | 1816026        | 1                    | TRACTOR ASSEMBLY  |   |   |        |
| - 17A                      | 1816028        | 1                    | COVER, RIGHT  |   |   |        |
| - 17B                      | 1816027        | 1                    | COVER, LEFT   |   |   |        |
| - 17C                      | 1812272        | 1                    | SPRING  |   |   |        |
| - 17D                      | 1812271        | 1                    | PIVOT   |   |   |        |
| - 18                       | 264998         | 1                    | ROLL PIN- 0.250 LG  |   |   |        |
| - 19                       | 1794534        | 2                    | DISC ASSEMBLY   |   |   |        |
| - 19A                      | 1816025        | 1                    | TRACTOR ASSEMBLY  |   |   |        |
| - 19B                      | 1812301        | 1                    | DETECTOR ASM  |   |   |        |
| - 19C                      | 336628         | 1                    | NUT   |   |   |        |
| - 20                       | 38433          | 1                    | SCREW, FL HD- 4-40 X 0.250 LG   |   |   | ATT PT |
| - 21                       | 1794618        | 1                    | BAR   |   |   | ATT PT |
| - 22                       | 5528           | 2                    | SCREW, BD HD- 8-32 X 0.625 LG   |   |   | ATT PT |
| - 23                       | 845            | 2                    | SCREW, FL HD- 8-32 X 0.500 LG   |   |   | ATT PT |
| - 24                       | 58207          | 3                    | SCREW, BD HD- 8-32 X 0.250 LG   |   |   | ATT PT |
| - 25                       | 34512          | 1                    | SCREW, BD HD- 8-32 X 0.375 LG   |   |   | ATT PT |
| - 26                       | 1794814        | 1                    | STOP  |   |   |        |
| - 27                       | 25627          | 1                    | SCREW, BD HD- 8-32 X 0.500 LG   |   |   | ATT PT |
| - 28                       | 22478          | 1                    | WASHER, FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 29                       | 1814630        | 1                    | STOP  |   |   |        |
| - 30                       | 1821429        | 1                    | SEAL ASM  |   |   |        |
| - 31                       | 1821426        | 1                    | GUIDE ASM, PRINT POSITION   |   |   |        |
| - 32                       | 166758         | 4                    | SCREW, BD HD- 8-32 X 0.437 LG   |   |   | ATT PT |
| - 33                       | 22478          | 1                    | WASHER, FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 34                       | 5213276        | 1                    | CLAMP   |   |   | ATT PT |
| - 35                       | 1815419        | 1                    | SPACER  |   |   |        |
| - 36                       | 1815417        | 1                    | PIN   |   |   |        |
| - 37                       | 34512          | 2                    | SCREW, BD HD- 8-32 X 0.375 LG   |   |   | ATT PT |
| - 38                       | 1815416        | 1                    | SPACER  |   |   |        |
| - 39                       | 34512          | 1                    | PIN   |   |   |        |
| - 40                       | 23141          | 1                    | SCREW, BD HD- 8-32 X 0.375 LG   |   |   | ATT PT |
| - 41                       | 1754806        | 1                    | WASHER, FLAT- 0.199 ID X 0.562 OD   |   |   | ATT PT |
| - 41A                      | 1794787        | 1                    | SCALE   |   |   |        |
| - 41B                      | 1794792        | 1                    | SHIELD, MODEL 1 AND 2   |   |   |        |
| - 41C                      | 1794791        | 1                    | BRACKET   |   |   |        |
| - 41D                      | 10170          | 2                    | BRACKET   |   |   |        |
| - 42                       | 1794572        | 1                    | SCREW, BD HD- 6-32 X 0.250 LG   |   |   |        |
| - 43                       | 6808520        | 1                    | FRONT ASSEMBLY  |   |   |        |
| - 43                       | 1794826        | 1                    | FOR DETAIL BREAKDOWN SEE FIGURE 5   |   |   |        |
| - 44                       | 438588         | 2                    | FORMS GUIDE ASSEMBLY-MODEL 1  |   |   |        |
| - 45                       | 1090873        | 2                    | FOR DETAIL BREAKDOWN SEE FIGURE 6   |   |   |        |
| - 46                       | 35229          | 2                    | HAMMER UNIT ASSEMBLY, MODEL 2   |   |   |        |
| - 47                       | 1800702        | 2                    | FOR DETAIL BREAKDOWN SEE FIGURE 7   |   |   |        |
|                            |                |                      | SCREW, BD HD- 8-32 X 1.250 LG   |   |   | ATT PT |
|                            |                |                      | LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD  |   |   | ATT PT |
|                            |                |                      | WASHER, FL- 0.171 ID X 0.437 OD   |   |   | ATT PT |
|                            |                |                      | SCREW, SHLDR- 8-32  |   |   | ATT PT |



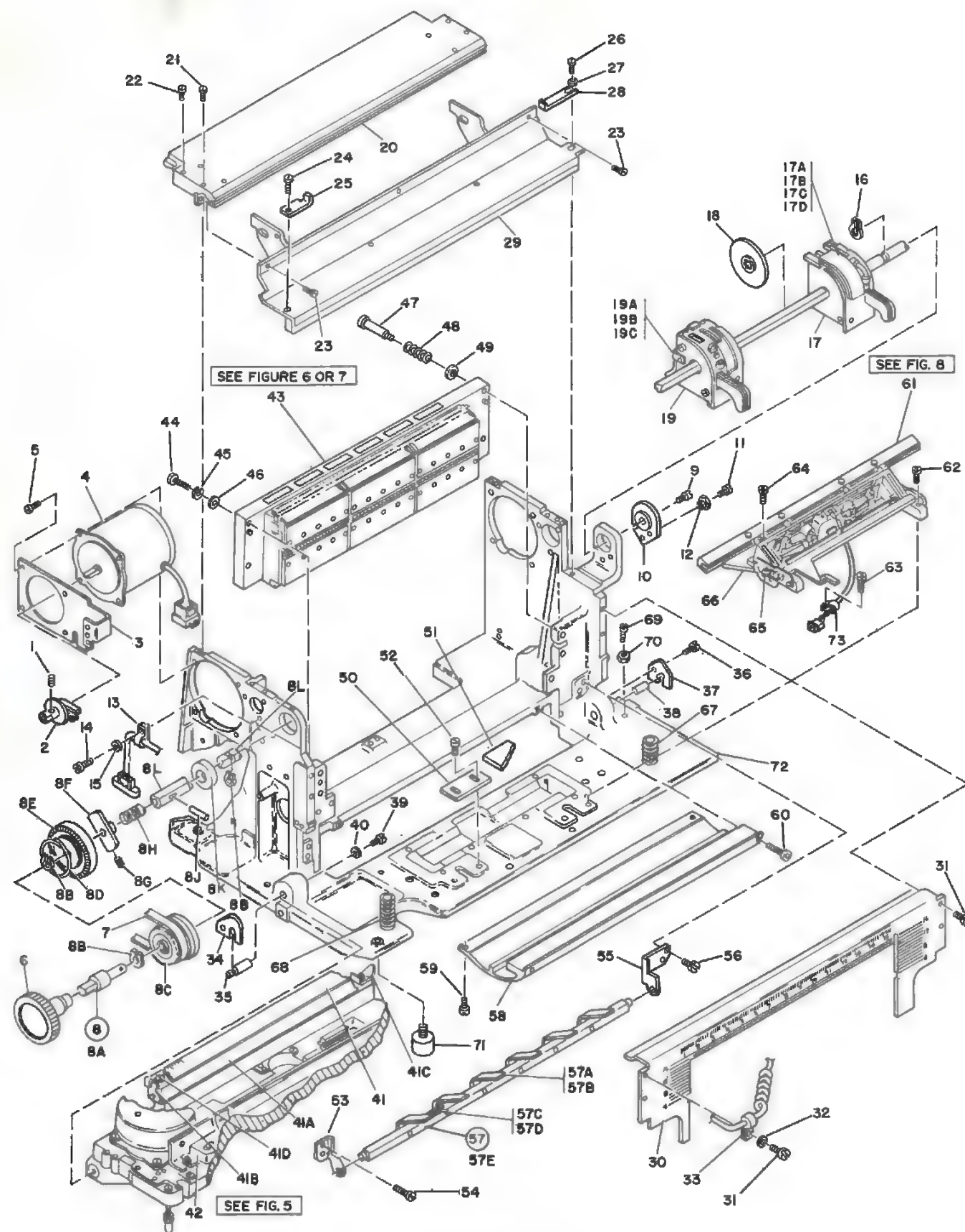


FIGURE 4. BASIC MECHANISM ASSEMBLY. SEE LIST 4.

# BASIC MECHANISM ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                           |   |   |   |
|----------------------------|----------------|----------------------|---------------------------------------|---|---|---|
|                            |                |                      | 1                                     | 2 | 3 | 4 |
| 4 - 48                     | 23105          | 2                    | . SPRING, COMPRESSION                 |   |   |   |
| - 49                       | 120571         | 2                    | . WASHER                              |   |   |   |
| - 50                       | 1821393        | 2                    | . PLATE                               |   |   |   |
| - 51                       | 1800481        | 1                    | . PLATE                               |   |   |   |
| - 52                       | 34512          | 3                    | . SCREW, BD HD- 8-32 X 0.375 LG       |   |   |   |
| - 53                       | 1815888        | 1                    | . BRACKET-LH                          |   |   |   |
| - 54                       | 186759         | 2                    | . SCREW, BD HD- 8-32 X 0.312 LG       |   |   |   |
| - 55                       | 1815889        | 1                    | . BRACKET-RH                          |   |   |   |
| - 56                       | 186759         | 1                    | . SCREW, BD HD- 8-32 X 0.312 LG       |   |   |   |
| - 57                       | 1815892        | 1                    | . BAR ASM, TENSION                    |   |   |   |
| - 57A                      | 1815887        | 6                    | . SPRING                              |   |   |   |
| - 57B                      | 55726          | 6                    | . SCREW, BD HD- 6-32 X 0.188 LG       |   |   |   |
| - 57C                      | 1815890        | 1                    | . BRACKET                             |   |   |   |
| - 57D                      | 55726          | 2                    | . SCREW, BD HD- 6-32 X 0.188 LG       |   |   |   |
| - 57E                      | 1815886        | 1                    | . BAR, FORMS TENSION                  |   |   |   |
| - 58                       | 1815870        | 1                    | . GUIDE, LOWER                        |   |   |   |
| - 59                       | 5528           | 2                    | . SCREW, BD HD- 8-32 X 0.625 LG       |   |   |   |
| - 60                       | 186952         | 2                    | . SCREW, SOC HEX HD- 10-32 X 1.750 LG |   |   |   |
| - 61                       | 1794970        | 1                    | . CLAMP ASSEMBLY                      |   |   |   |
|                            |                |                      | FOR DETAIL BREAKDOWN SEE FIGURE 8     |   |   |   |
| - 62                       | 438586         | 2                    | . SCREW, BD HD- 8-32 X 0.875 LG       |   |   |   |
| - 63                       | 25627          | 1                    | . SCREW, BD HD- 8-32 X 0.500 LG       |   |   |   |
| - 64                       | 25627          | 2                    | . SCREW, BD HD- 8-32 X 0.500 LG       |   |   |   |
| - 65                       | 1164127        | 1                    | . CLEVIS ASSEMBLY, INDEX LINK         |   |   |   |
| - 66                       | 1076717        | 1                    | . LINK                                |   |   |   |
| - 67                       | 1821330        | 1                    | . SPRING, COMPRESSION                 |   |   |   |
| - 68                       | 1821330        | 1                    | . SPRING, COMPRESSION                 |   |   |   |
| - 69                       | 2031           | 1                    | . SCREW, FIL HD- 8-32 X 0.625 LG      |   |   |   |
| - 70                       | 257189         | 1                    | . NUT, HEX- 8-32                      |   |   |   |
| - 71                       | 1800685        | 1                    | . MOUNT, SHOCK                        |   |   |   |
| - 72                       | 1794900        | 1                    | . CASTING                             |   |   |   |
| - 73                       | 5213276        | 1                    | . CLAMP                               |   |   |   |

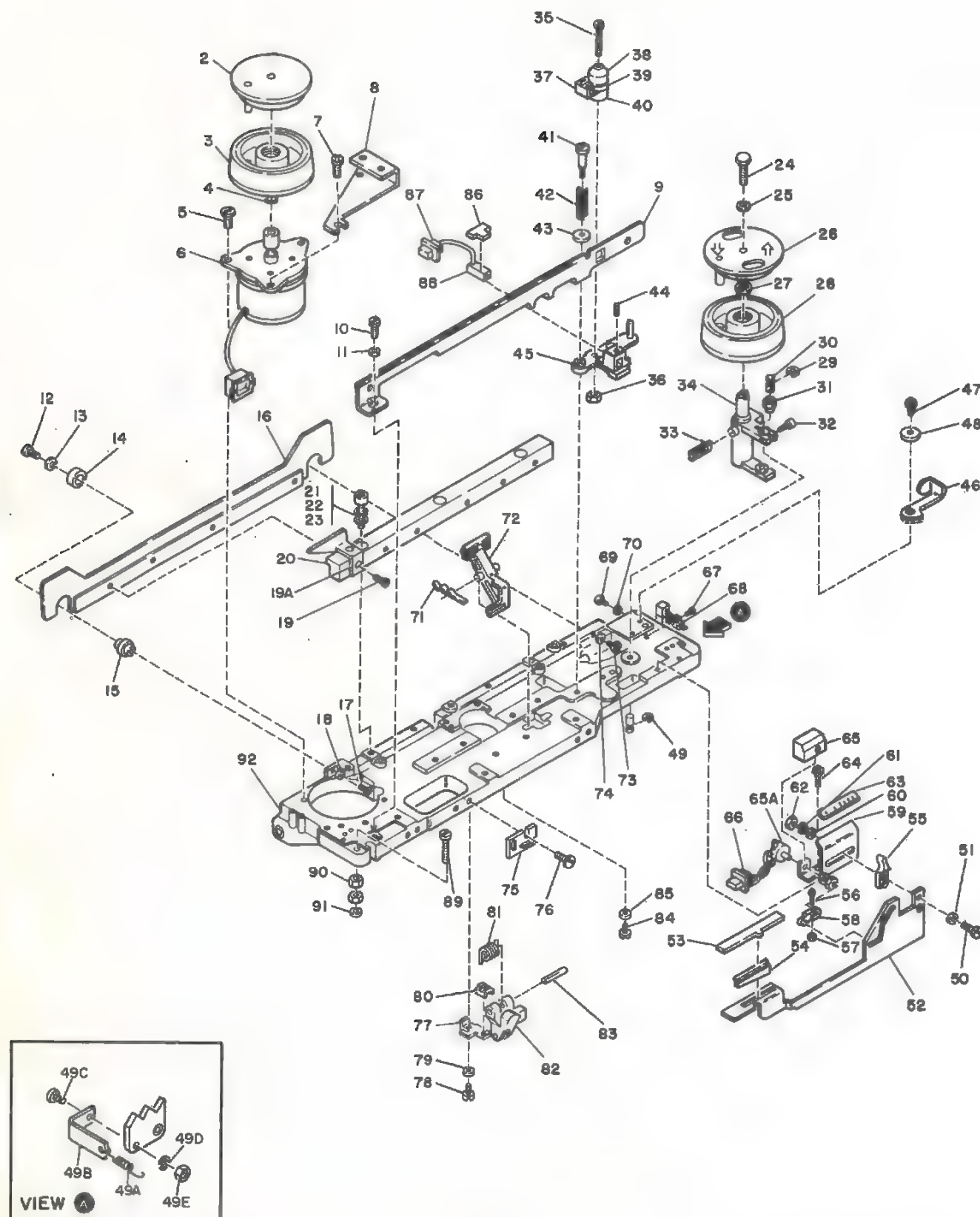


FIGURE 5. FRONT ASSEMBLY. SEE LIST 5.

# FRONT ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |
|----------------------------|----------------|----------------------|--|
| 5 -                        | 1754572        | REF                  | FRONT ASSEMBLY<br>FOR NEXT HIGHER ASM SEE FIGURE 4-42<br>FOR ILLUSTRATION SEE FIGURE 5 |
| - 2                        | 1821401        | 1                    | FLYWHEEL ASM   |
| - 3                        | 1801905        | 1                    | PULLEY ASSEMBLY, DRIVE   |
| - 4                        | 251227         | 1                    | RING, RETAINING  |
| - 5                        | 32042          | 1                    | SCREW, BD HD- 10-32 X 0.375 LG   |
| - 6                        | 1816039        | 1                    | MOTOR ASM  |
| - 7                        | 55916          | 2                    | SCREW, BD HD- 10-32 X 0.625 LG   |
| - 8                        | 5576609        | 1                    | BRACKET  |
| - 9                        | 4136961        | 1                    | GUARD  |
| - 10                       | 25627          | 1                    | SCREW, BD HD- 8-32 X 0.500 LG  |
| - 11                       | 22478          | 1                    | WASHER, FL- 0.170 ID X 0.375 OD  |
| - 12                       | 55726          | 2                    | SCREW, BD HD- 6-32 X 0.188 LG  |
| - 13                       | 22478          | 2                    | WASHER, FL- 0.170 ID X 0.375 OD  |
| - 14                       | 1821358        | 2                    | BEARING- 0.354 ID X 0.944 OD X 0.276 THK   |
| - 15                       | 1815421        | 2                    | STUD- 6-32   |
| - 16                       | 5576604        | 1                    | SHIELD ASM   |
| - 17                       | 10170          | 1                    | SCREW, BD HD- 6-32 X 0.250 LG  |
| - 18                       | 1090394        | 1                    | WASHER, FL- 0.155 ID X 0.312 OD  |
| - 19                       | 438552         | 6                    | SCREW, NACH BD HD- 4-40 X 0.750 LG   |
| - 19A                      | 5593456        | 1                    | GUIDE  |
| - 20                       | 1794691        | 1                    | PLATEN, BASIC  |
| - 21                       | 186931         | 3                    | SCREW, CAP HEX SOC HD- 8-32 X 1.500 LG   |
| - 22                       | 35229          | 3                    | WASHER, FL- 0.171 ID X 0.437 OD  |
| - 23                       | 1090873        | 3                    | LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD   |
| - 24                       | 1091035        | 1                    | SCREW, HEX HD- 8-32 X 0.375 LG   |
| - 25                       | 856516         | 2                    | WASHER, FL- 0.173 ID X 0.560 OD  |
| - 26                       | 1812464        | 1                    | COVER, IDLER   |
| - 27                       | 1794754        | 1                    | PLATE, WEAR  |
| - 28                       | 1801906        | 1                    | PULLEY ASSEMBLY, IDLER   |
| - 29                       | 257982         | 1                    | CLIP, RETAINING E-TYPE   |
| - 30                       | 1754809        | 1                    | SHAFT  |
| - 31                       | 1794808        | 1                    | ECCENTRIC  |
| - 32                       | 186929         | 1                    | SCREW, CAP, SOC HD, FLUTED-6-32 X 0.875 LG   |
| - 33                       | 1800527        | 1                    | SPRING, COMPRESSION  |
| - 34                       | 1812463        | 1                    | PIVOT ASSEMBLY   |
| - 35                       | 438589         | 1                    | SCREW, BD HD- 8-32 X 1.500 LG  |
| - 36                       | 1754837        | 1                    | NUT  |
| - 37                       | 1794758        | 1                    | CLEANER  |
| - 38                       | 1815409        | 1                    | SUPPORT, UPPER BEARING   |
| - 39                       | 1794753        | 1                    | BEARING  |
| - 40                       | 1815410        | 1                    | SUPPORT, LOWER BEARING   |
| - 41                       | 1812457        | 2                    | SCREW, SHOULDER- 8-32  |
| - 42                       | 1794770        | 2                    | SPRING   |
| - 43                       | 139050         | 2                    | WASHER, FL- 0.252 ID X 0.812 OD  |
| - 44                       | 257956         | 1                    | SETSCREW, FL PT- 4-40 X 0.187 LG   |
| - 45                       | 1794838        | 1                    | BRACKET ASM  |
| - 46                       | 5576636        | 1                    | LEVER  |
| - 47                       | 332620         | 1                    | SCREW, BD HD- 10-32 X 0.500 LG   |
| - 48                       | 1812334        | 1                    | SPACER   |
| - 49                       | 257982         | 1                    | CLIP, RETAINING E-TYPE   |
| - 49A                      | 1815420        | 1                    | SPRING   |
| - 49B                      | 1815418        | 1                    | BRACKET  |
| - 49C                      | 322550         | 1                    | SCREW, BD HD- 6-32 X 0.500 LG  |
| - 49D                      | 6364           | 1                    | LOCKWASHER, SPLIT- 0.141 ID X 0.253 OD   |
| - 49E                      | 257187         | 1                    | NUT, HEX- 6-32   |
| - 50                       | 438551         | 1                    | SCREW, BD HD- 4-40 X 0.625 LG  |
| - 51                       | 807612         | 1                    | WASHER, FLAT- 0.113 ID X 0.312 OD  |
| - 52                       | 1821421        | 1                    | CARRIER  |
| - 53                       | 1810966        | 1                    | PLATE, RAMP  |
| - 54                       | 1794649        | 1                    | RAMP   |
| - 55                       | 1810967        | 1                    | KNOB   |
| - 56                       | 438542         | 1                    | SCREW, BD HD- 2-56 X 0.500 LG  |
| - 57                       | 47987          | 1                    | NUT, HEX- 2-56   |
| - 58                       | 1801999        | 1                    | FOLLOWER   |
| - 59                       | 1810964        | 1                    | BRACKET, INDICATOR   |
| - 60                       | 807612         | 1                    | WASHER, FLAT- 0.113 ID X 0.312 OD  |
| - 61                       | 257984         | 1                    | LOCKWASHER, SPLIT- 0.115 ID X 0.212 OD   |
| - 62                       | 37913          | 1                    | NUT, HEX- 0.375-16   |
| - 63                       | 1810963        | 1                    | LABEL  |
| - 64                       | 38235          | 1                    | SCREW, BD HD- 6-32 X 0.312 LG  |
| - 65                       | 1812493        | 1                    | COVER, POTENTIOMETER   |
| - 65A                      | 1810970        | 1                    | POTENTIOMETER ASM  |
| - 66                       | 1166117        | 1                    | HOUSING, PIN TERMINAL  |
| - 67                       | 236550         | 1                    | SCREW, BD HD- 4-40 X 0.375 LG  |
| - 68                       | 5213276        | 1                    | CLAMP  |



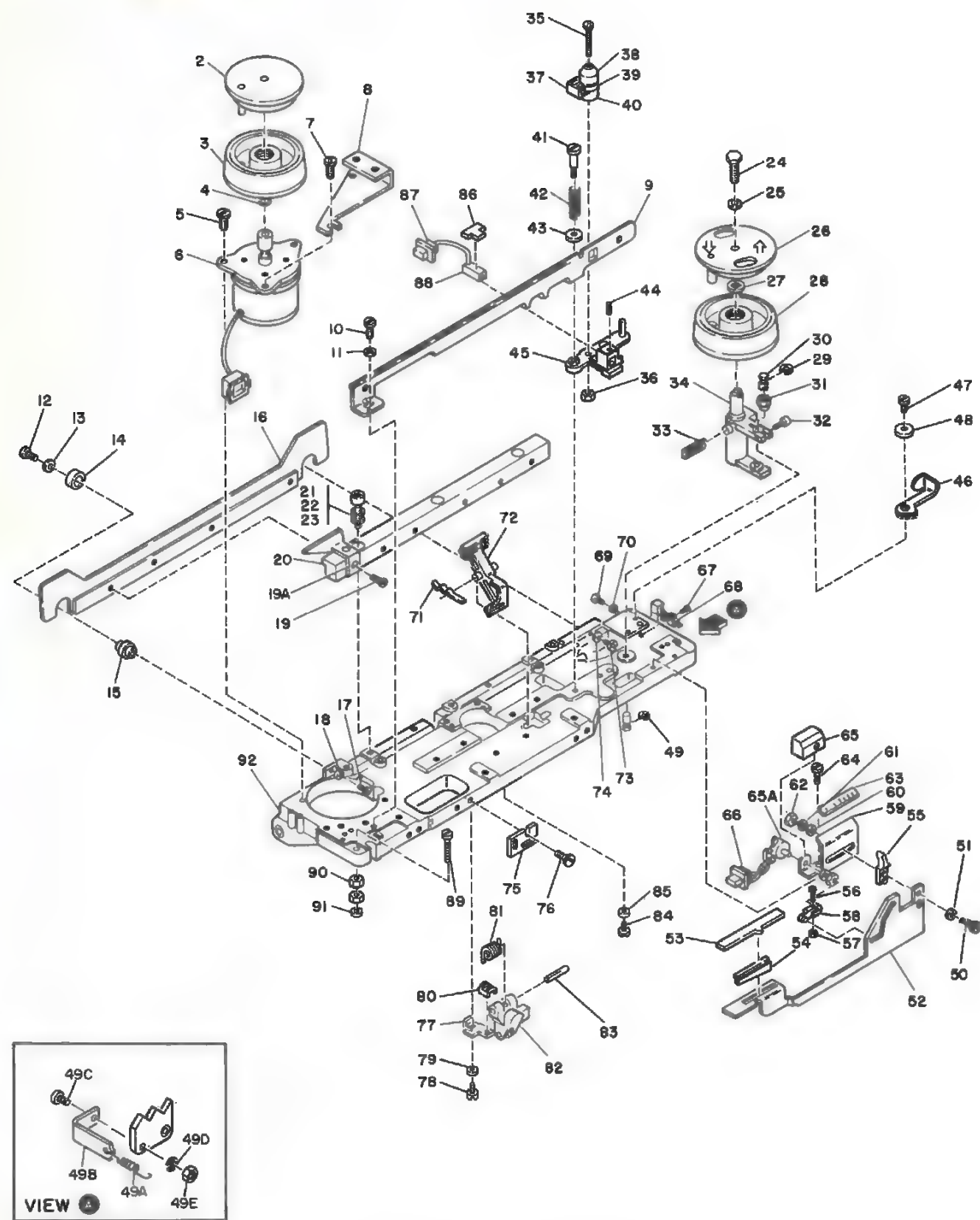


FIGURE 5. FRONT ASSEMBLY. SEE LIST 5.

| FRONT ASSEMBLY             |                |                      |  |
|----------------------------|----------------|----------------------|--|
| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                              |
| 5 - 69                     | 204616         | 1                    | 1. SCREW,HEX HD- 10-32 X 1.000 LG        |
| - 70                       | 11598          | 1                    | 1. NUT,HEX- 10-32                        |
| - 71                       | 1801991        | 1                    | 1. SPRING,RETAINING                      |
| - 72                       | 1801989        | 1                    | 1. LEVER                                 |
| - 73                       | 322550         | 1                    | 1. SCREW,BD HD- 6-32 X 0.500 LG ATT PT   |
| - 74                       | 1090394        | 1                    | 1. WASHER,FL- 0.155 ID X 0.312 OD ATT PT |
| - 75                       | 1811021        | 1                    | 1. PLATE                                 |
| - 76                       | 38235          | 2                    | 2. SCREW,BD HD- 6-32 X 0.312 LG ATT PT   |
| - 77                       | 1821407        | 1                    | 1. RETAINER,CARRIER ATT PT               |
| - 78                       | 38387          | 1                    | 1. SCREW,FIL HD- 10-32 X 0.687 LG ATT PT |
| - 79                       | 324            | 1                    | 1. WASHER,FL- 0.193 ID X 0.750 OD ATT PT |
| - 80                       | 1821406        | 1                    | 1. PLATE,PRESSURE                        |
| - 81                       | 1800487        | 1                    | 1. SPRING,FOLLOWER                       |
| - 82                       | 1810969        | 1                    | 1. FOLLOWER ASSEMBLY                     |
| - 83                       | 104712         | 1                    | 1. PIN                                   |
| - 84                       | 38387          | 1                    | 1. SCREW,FIL HD- 10-32 X 0.687 LG        |
| - 85                       | 324            | 1                    | 1. WASHER,FL- 0.193 ID X 0.750 OD        |
| - 86                       | 4136975        | 1                    | 1. SPACER                                |
| - 87                       | 5214573        | 1                    | 1. HOUSING,MALE                          |
| - 88                       | 1803793        | 1                    | 1. EMITTER ASSEMBLY                      |
| - 89                       | 106419         | 1                    | 1. SCREW,BD HD- 10-32 X 1.750 LG ATT PT  |
| - 90                       | 11598          | 2                    | 2. NUT,HEX- 10-32 ATT PT                 |
| - 91                       | 2638059        | 1                    | 1. BUMPER                                |
| - 92                       | 1807647        | 1                    | 1. BASF ASSEMBLY,FRONT                   |



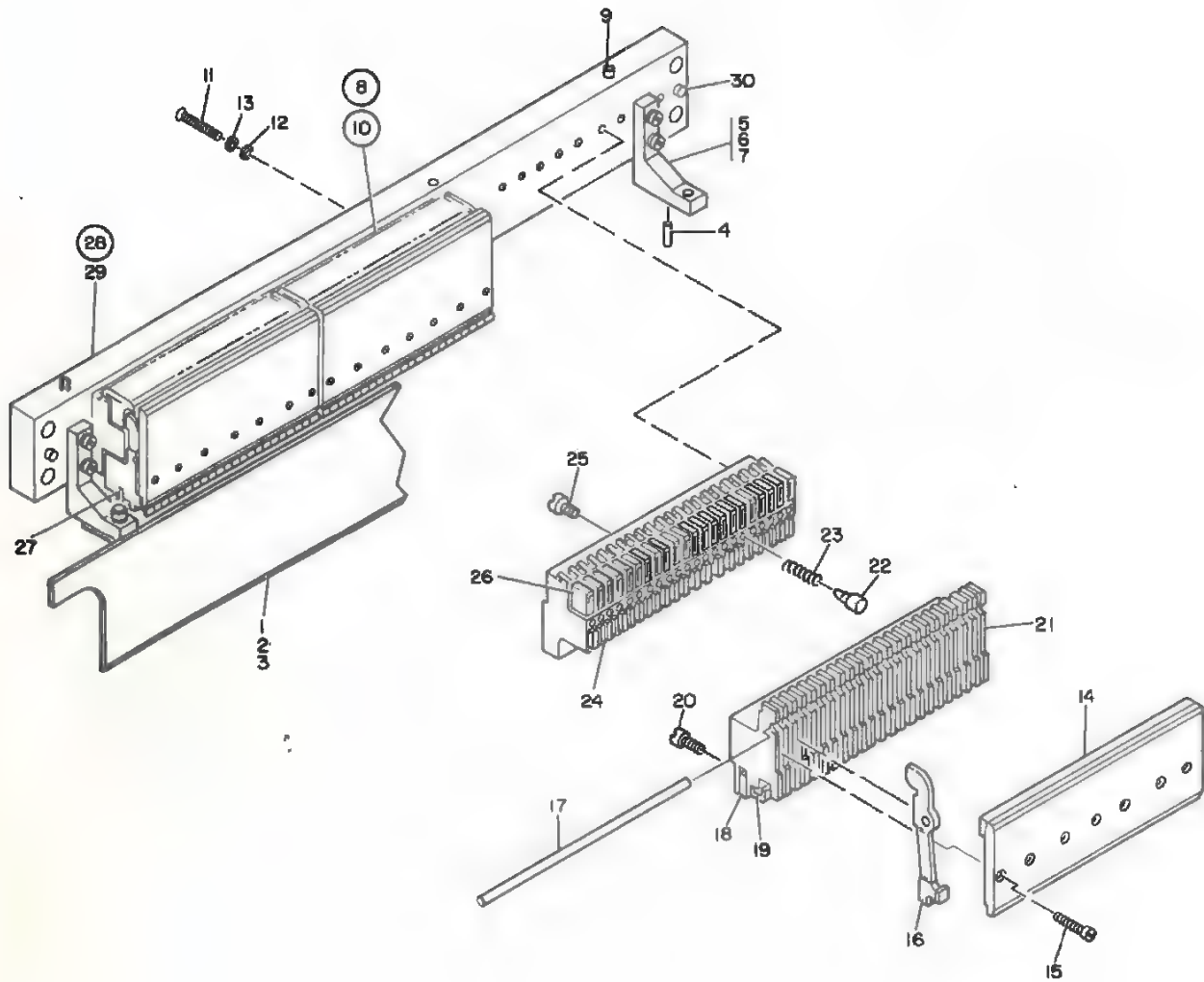


FIGURE 6. HAMMER UNIT ASSEMBLY, MODEL 1. SEE LIST 6.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |   |   |        |
|----------------------------|----------------|----------------------|--|---|---|--------|
|                            |                |                      | 1  | 2 | 3 | 4      |
| 6 -                        | 6808520 HP     | REF                  | FORMS GUIDE ASSEMBLY-MODEL 1<br>FOR NEXT HIGHER ASM SEE FIGURE 4-43<br>FOR ILLUSTRATION SEE FIGURE 6 |   |   |        |
| - 1                        | 4703276 NR     | 1                    | . GUIDE  |   |   |        |
| - 2                        | 101807         | 2                    | . SCREW,SOC HEX HD- 8-32 X 0.625 LG  |   |   | ATT PT |
| - 3                        | 22478          | 2                    | . WASHER,FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 4                        | 1798805        | 2                    | . DOWEL PIN  |   |   |        |
| - 5                        | 1794627 NR     | 2                    | . BRACKET  |   |   |        |
| - 6                        | 5528           | 4                    | . SCREW,BD HD- 8-32 X 0.625 LG   |   |   | ATT PT |
| - 7                        | 22478          | 4                    | . WASHER,FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 8                        | 1794825        | 1                    | . HAMMER UNIT ASM  |   |   |        |
| - 9                        | 1077739        | 2                    | . PIN  |   |   |        |
| - 10                       | 1794656        | 3                    | . BLOCK ASM  |   |   |        |
| - 11                       | 10340          | 9                    | . . SCREW  |   |   | ATT PT |
| - 12                       | 22478          | 9                    | . . WASHER,FL- 0.170 ID X 0.375 OD   |   |   | ATT PT |
| - 13                       | 1090873        | 9                    | . . LOCKWASHER,SPLIT- 0.168 ID X 0.296 OD  |   |   | ATT PT |
| - 14                       | 1794800        | 1                    | . . PLATE ASM  |   |   |        |
| - 15                       | 1794630        | 7                    | . . . SCREW,BD HD- 2-56 X 0.470 LG   |   |   | ATT PT |
| - 16                       | 1800707        | 22                   | . . . LEVER,HAMMER   |   |   |        |
| - 17                       | 1800718        | 1                    | . . . SHAFT,PIVOT  |   |   |        |
| - 18                       | 1800741        | 1                    | . . . BAR,RETAINER   |   |   |        |
| - 19                       | 1800717        | 1                    | . . . BUMPER   |   |   |        |
| - 20                       | 1800703        | 22                   | . . . SCREW,CAP SOC HD- 4-40 X 0.750 LG  |   |   |        |
| - 21                       | 1754801        | 1                    | . . . COMB BAR AND PIN ASM   |   |   |        |
| - 22                       | 1815359        | 22                   | . . . PLUNGER  |   |   |        |
| - 23                       | 1800704        | 22                   | . . . SPRING   |   |   |        |
| - 24                       | 1815352        | 1                    | . . . STATOR BLOCK ASM   |   |   |        |
| - 25                       | 1132887        | 2                    | . . . SCREW,BD HD- 4-40 X 0.531 LG   |   |   |        |
| - 26                       | 1800796        | 22                   | . . . COIL ASSEMBLY,HAMMER   |   |   |        |
| - 27                       | 1800722        | 1                    | . . . POSITION INDICATOR   |   |   |        |
| - 28                       | 1815358        | 1                    | . . . BAR AND PIN ASM  |   |   |        |
| - 29                       | 1815357        | 1                    | . . . BAR,HAMMER   |   |   |        |
| - 30                       | 104702         | 11                   | . . . PIN  |   |   |        |

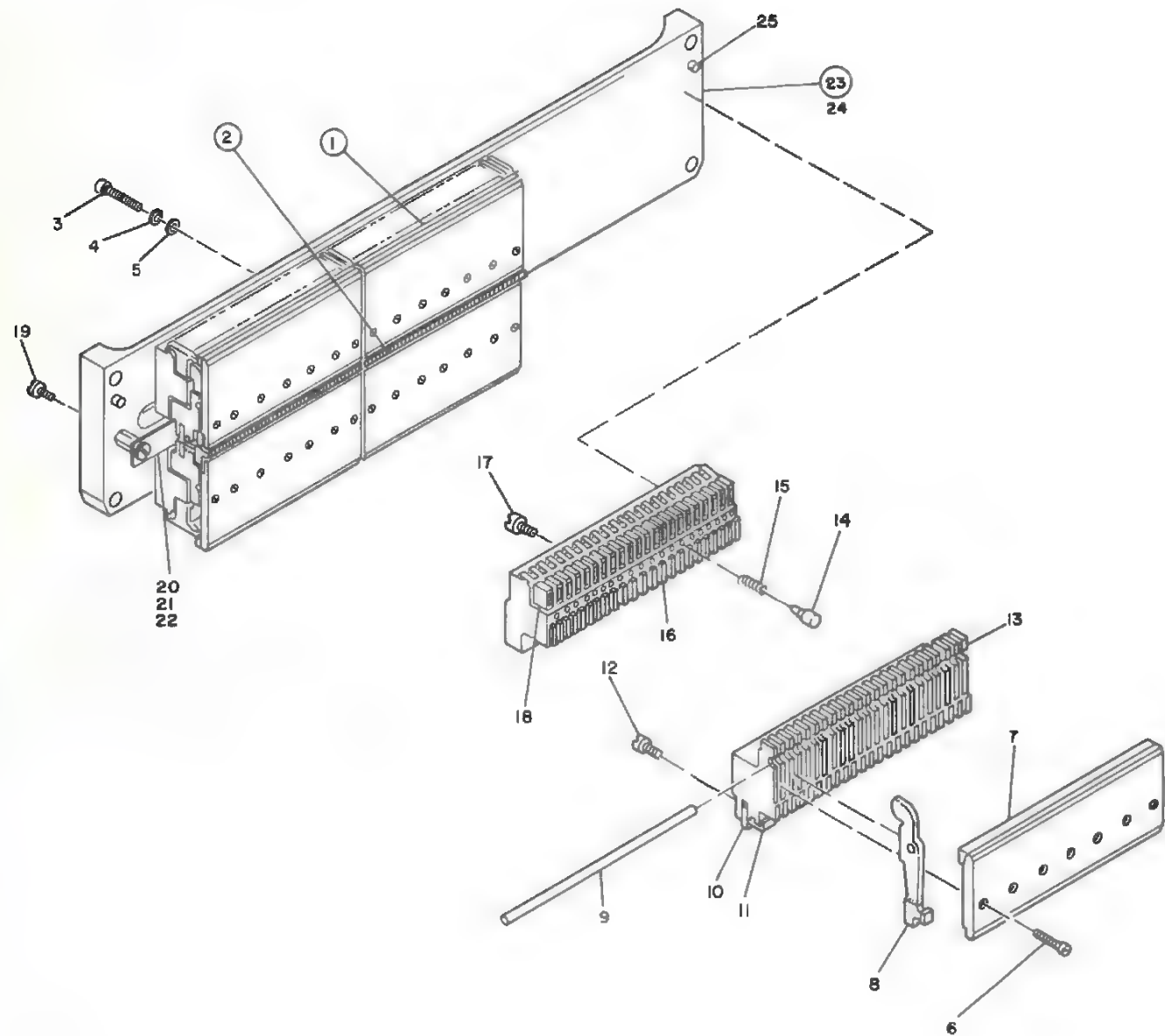


FIGURE 7. HAMMER UNIT ASSEMBLY, MODEL 2. SEE LIST 7.

HAMMER UNIT ASSEMBLY, MODEL 2

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION   |
|----------------------------|----------------|----------------------|---|
| 7 -                        | 1794826        | REF                  | HAMMER UNIT ASSEMBLY, MODEL 2<br>FOR NEXT HIGHER ASM SEE FIGURE 4-43<br>FOR ILLUSTRATION SEE FIGURE 7 |
| - 1                        | 1794845        | 3                    | . BLOCK ASM, 22 HAMMERS-UPPER   |
| - 2                        | 1794844        | 3                    | . BLOCK ASM, 22 HAMMERS-ICWIR   |
| - 3                        | 186931         | 9                    | . SCREW, CAP HEX SOC HD- 8-32 X 1.500 LG ATT PT   |
| - 4                        | 1090873        | 9                    | . LOCKWASHER, SPLIT- 0.168 ID X 0.296 OD ATT PT   |
| - 5                        | 1117437        | 9                    | . WASHER, PLAT- 0.171 ID X 0.438 OD ATT PT  |
| - 6                        | 1794630        | 7                    | . SCREW, BD HD- 2-56 X 0.470 LG   |
| - 7                        | 1794779        | 1                    | . PLATE ASSEMBLY, UPPER ATT PT  |
| - 7                        | 1794761        | 1                    | . PLATE ASSEMBLY, ICWIR   |
| - 8                        | 1794815        | 22                   | . HAMMER  |
| - 9                        | 1800718        | 1                    | . SHAFT, PIVOT  |
| - 10                       | 1800741        | 1                    | . BAR, RETAINER   |
| - 11                       | 1815857        | 1                    | . BUMPER  |
| - 12                       | 1800703        | 22                   | . SCREW, CAP SOC HD- 4-40 X 0.750 LG  |
| - 13                       | 1815864        | 1                    | . CMB BAR AND PIN ASM   |
| - 14                       | 1815359        | 22                   | . PLUNGER   |
| - 15                       | 1800704        | 22                   | . SPRING, COMPRESSION- 15.2 COILS   |
| - 16                       | 1815352        | 1                    | . STATOR BLOCK ASM  |
| - 17                       | 1132887        | 2                    | . SCREW, BD HD- 4-40 X 0.531 LG   |
| - 18                       | 1800796        | 22                   | . COIL ASSEMBLY, HAMMER   |
| - 19                       | 322552         | 1                    | . SCREW, BD HD- 6-32 X 0.875 LG ATT PT  |
| - 20                       | 55726          | 1                    | . SCREW, BD HD- 6-32 X 0.188 LG   |
| - 21                       | 1815929        | 1                    | . SPACER- 6-32 X 0.450 LG   |
| - 22                       | 1815932        | 1                    | . LABEL   |
| - 23                       | 1815865        | 1                    | . BAR AND PIN ASM   |
| - 24                       | 1815859        | 1                    | . BAR   |
| - 25                       | 104701         | 20                   | . PIN   |

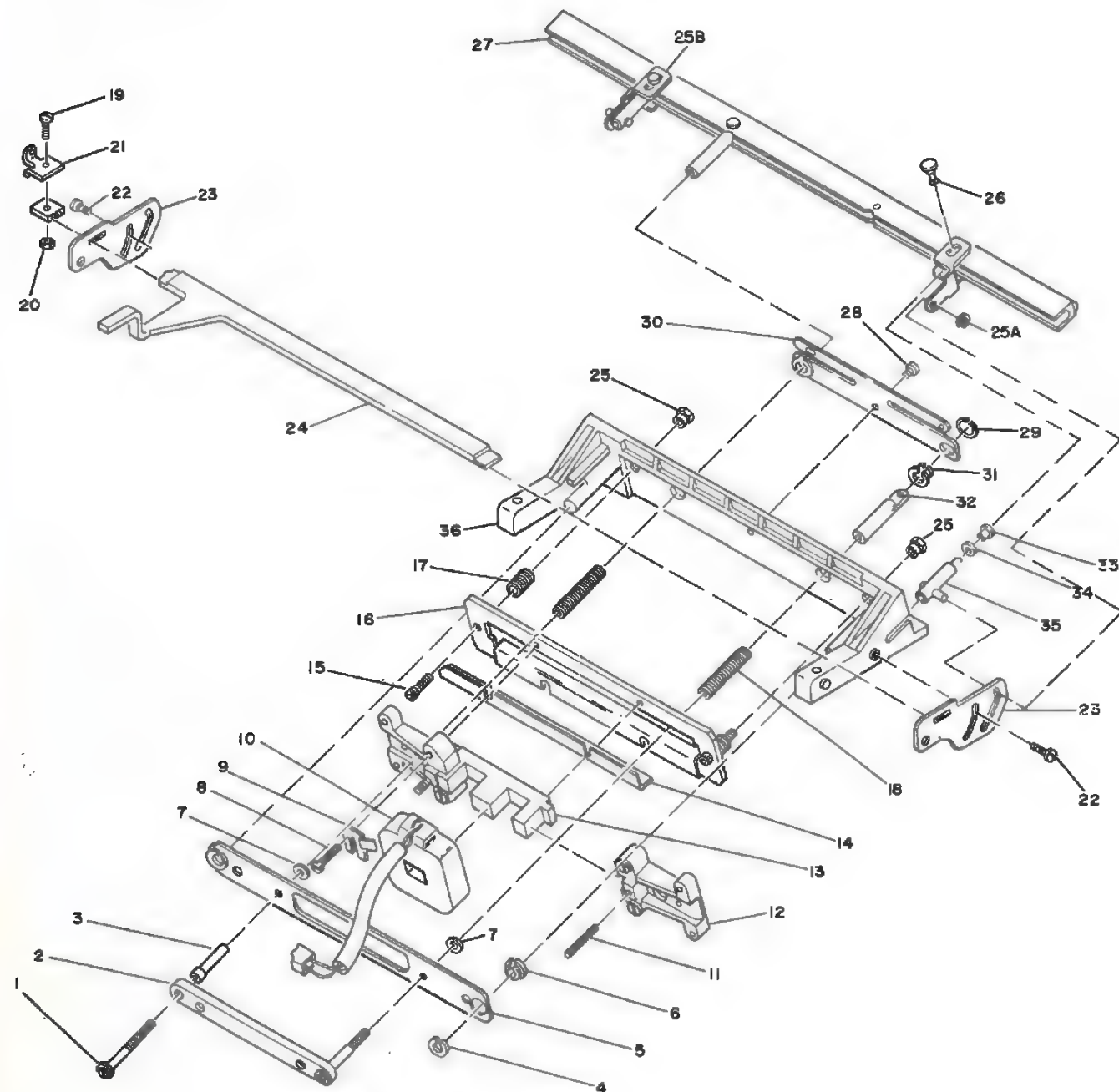


FIGURE 8. CLAMP ASSEMBLY, LOWER. SEE LIST 8.

CLAMP ASSEMBLY, LOWER

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION   |   |   |   |
|----------------------------|----------------|----------------------|---|---|---|---|
|                            |                |                      | 1   | 2 | 3 | 4 |
| B -                        | 1794970        | REF                  | CLAMP ASSEMBLY, LOWER<br>FOR NEXT HIGHER ASM SEE FIGURE 4-61<br>FOR ILLUSTRATION SEE FIGURE 8 |   |   |   |
| - 1                        | 1815436        | 2                    | . SCREW   |   |   |   |
| - 2                        | 1812536        | 1                    | . ARMATURE  |   |   |   |
| - 3                        | 1815415        | 2                    | . FERRULE   |   |   |   |
| - 4                        | 1814644        | 2                    | . KEEPER  |   |   |   |
| - 5                        | 1814647        | 1                    | . LOCATOR   |   |   |   |
| - 6                        | 828310         | 2                    | . BUSHING   |   |   |   |
| - 7                        | 5820539        | 2                    | . SPACER  |   |   |   |
| - 8                        | 322551         | 4                    | . SCREW, BD HD- 6-32 X 0.750 LG   |   |   |   |
| - 9                        | 1794545        | 1                    | . KEEPER  |   |   |   |
| - 10                       | 1812547        | 1                    | . COIL ASSEMBLY   |   |   |   |
| - 11                       | 251762         | 2                    | . SCREW   |   |   |   |
| - 12                       | 1812621        | 2                    | . BLOCK   |   |   |   |
| - 13                       | 1812543        | 1                    | . CORE  |   |   |   |
| - 14                       | 1815434        | 2                    | . STIFFENER   |   |   |   |
| - 15                       | 1794641        | 2                    | . SCREW   |   |   |   |
| - 16                       | 1814640        | 1                    | . PLATE   |   |   |   |
| - 17                       | 1815265        | 2                    | . SPRING  |   |   |   |
| - 18                       | 1815433        | 2                    | . SPRING  |   |   |   |
| - 19                       | 38235          | 1                    | . SCREW, BD HD- 6-32 X 0.312 LG   |   |   |   |
| - 20                       | 257187         | 1                    | . NUT, HEX- 6-32  |   |   |   |
| - 21                       | 1794638        | 1                    | . ADAPTOR   |   |   |   |
| - 22                       | 1154943        | 2                    | . SCREW, SELF TAP- 6-20 X 0.500 LG  |   |   |   |
| - 23                       | 1794634        | 2                    | . PLATE   |   |   |   |
| - 24                       | 1794633        | 1                    | . LEVER   |   |   |   |
| - 25                       | 1814641        | 2                    | . STUD, ADJUSTMENT  |   |   |   |
| - 25A                      | 1073416        | 2                    | . RETAINER, CRANK   |   |   |   |
| - 25B                      | 6808528        | 2                    | . RETAINER-LIMIT LINK   |   |   |   |
| - 26                       | 1794632        | 4                    | . PIN   |   |   |   |
| - 27                       | 1794636        | 1                    | . BAR ASM   |   |   |   |
| - 28                       | 5784857        | 1                    | . SCREW, PAN HD- 6-20 X 0.250 LG  |   |   |   |
| - 29                       | 1814644        | 2                    | . KEEPER  |   |   |   |
| - 30                       | 1814648        | 1                    | . LOCATOR   |   |   |   |
| - 31                       | 828310         | 2                    | . BUSHING   |   |   |   |
| - 32                       | 1794631        | 2                    | . PUSHER  |   |   |   |
| - 33                       | 1794637        | 2                    | . SPACER  |   |   |   |
| - 34                       | 1814642        | 2                    | . BUMPER  |   |   |   |
| - 35                       | 1794969        | 2                    | . TURF ASSEMBLY   |   |   |   |
| - 36                       | 1794645        | 1                    | . BLOCK   |   |   |   |



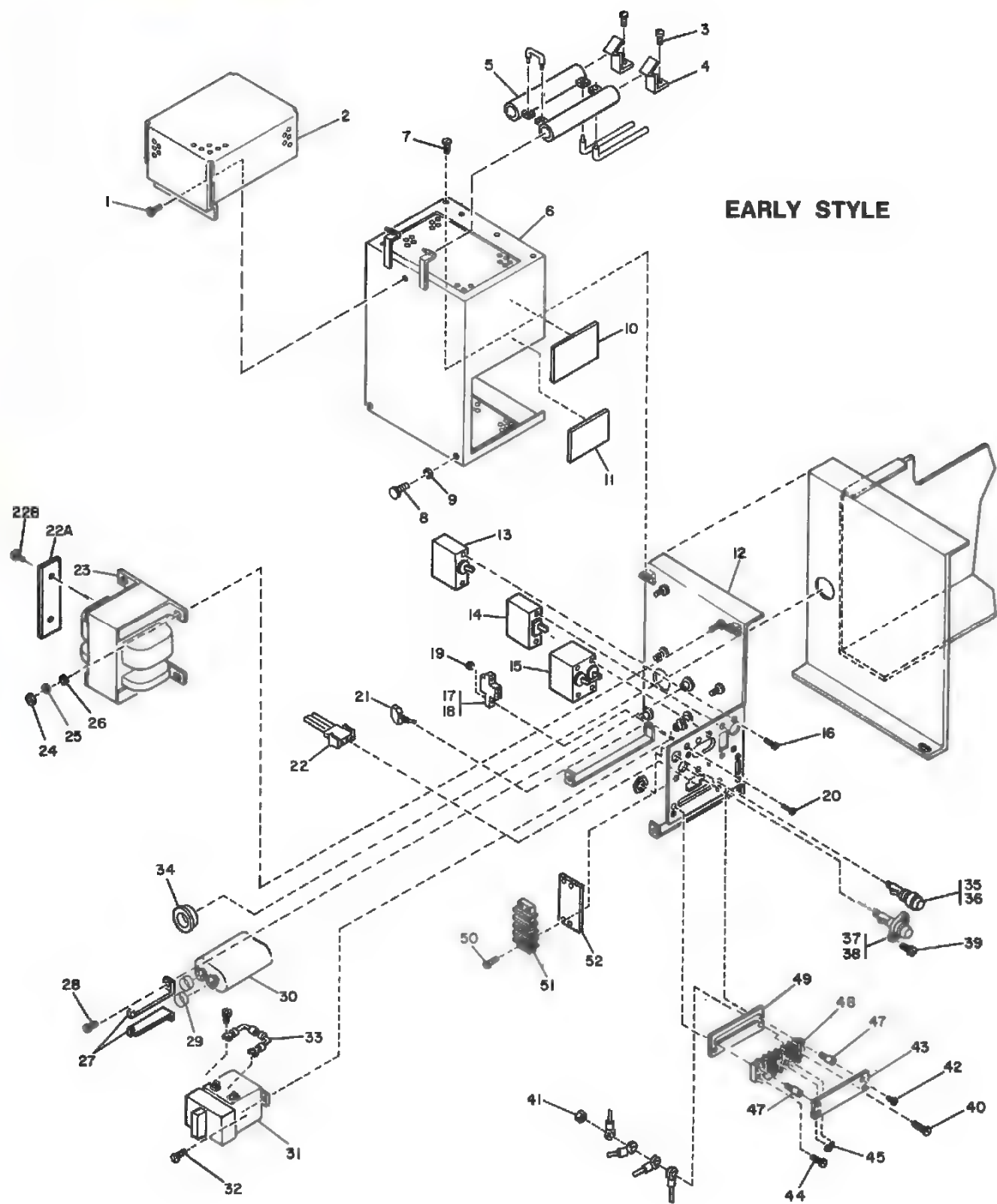


FIGURE 9. TRI-LEVEL POWER SUPPLY ASSEMBLY. SHEET 1 OF 2. INDEX NOS. 1-52. SEE LIST 9.

TRI-LEVEL POWER SUPPLY ASSEMBLY 50/60HZ

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | 1 2 3 4 | DESCRIPTION                                  |
|----------------------------|----------------|----------------------|---------|--|
| 9 -                        | 4138420        | REF                  |         | TRI-LEVEL POWER SUPPLY ASSEMBLY-50HZ         |
| -                          | 4138414        | REF                  |         | TRI-LEVEL POWER SUPPLY ASSEMBLY-60HZ         |
|                            |                |                      |         | FOR NEXT HIGHER ASM SEE FIGURE 1-185         |
|                            |                |                      |         | FOR ILLUSTRATION SEE FIGURE 9                |
| - 1                        | 58207          | 1                    |         | SCREW,BD HD- 8-32 X 0.250 LG ATT PT          |
| - 2                        | 4135135        | 1                    |         | RESISTOR SHIELD                              |
| - 3                        | 221790         | 2                    |         | SCREW,MACH BD HD- 8-32 X 0.187 LG ATT PT     |
| - 4                        | 2102204        | 2                    |         | BRACKET                                      |
| - 5                        | 212212E        | 2                    |         | RESISTOR,FXD 10 OHMS P/H 5% 50W              |
| - 6                        | 4135133        | 1                    |         | COVER  |
| - 7                        | 34512          | 2                    |         | SCREW,BD HD- 8-32 X 0.375 LG ATT PT          |
| - 8                        | 1074048        | 2                    |         | SCREW,MACH HEX HD 8-32 X 5/16 LG ATT PT      |
| - 9                        | 1090873        | 2                    |         | LOCKWASHER,SPLIT- 0.168 ID X 0.296 OD ATT PT |
| - 10                       | 4138421        | 1                    |         | LABEL,FUSE                                   |
| - 11                       | 2542403        | 1                    |         | LABEL,FUSE WARNING                           |
| - 12                       | 4135132        | 1                    |         | BASE PLATE                                   |
| - 13                       | 2281275        | 1                    |         | CIRCUIT BREAKER ASM,50 HZ                    |
| - 14                       | 5214000        | 1                    |         | CIRCUIT BREAKER                              |
| - 15                       | 2574126        | 1                    |         | CIRCUIT BREAKER                              |
| - 16                       | 55726          | 8                    |         | SCREW,BD HD- 6-32 X 0.188 LG ATT PT          |
| - 17                       | 5353851        | 1                    |         | CONNECTOR                                    |
| - 18                       | 5353852        | 3                    |         | CONTACT,FEMALE                               |
| - 19                       | 257187         | 2                    |         | NUT,HEX- 6-32 ATT PT                         |
| - 20                       | 322065         | 4                    |         | SCREW,BD HD- 6-32 X 0.625 LG ATT PT          |
| - 21                       | 5270314        | 1                    |         | SWITCH                                       |
| - 22                       | 1847527        | 1                    |         | CONNECTOR                                    |
| - 22A                      | 5236656        | 1                    |         | SHIELD                                       |
| - 22B                      | 10170          | 2                    |         | SCREW,BD HD- 6-32 X 0.250 LG ATT PT          |
| - 23                       | 4119491        | 1                    |         | TRANSFORMER 50HZ                             |
| - 23                       | 4135143        | 1                    |         | TRANSFORMER 60HZ                             |
| - 24                       | 1159E          | 4                    |         | NUT,HEX- 10-32 ATT PT                        |
| - 25                       | 56079          | 4                    |         | LOCKWASHER,EXT TEETH- 0.204 ID X 0.410 O     |
| - 26                       | 45690          | 4                    |         | WASHER,FL- 0.203 ID X 0.438 OD               |
| - 27                       | 625955         | 2                    |         | BRACKET                                      |
| - 28                       | 322551         | 2                    |         | SCREW,BD HD- 6-32 X 0.750 LG ATT PT          |
| - 29                       | 526378         | 2                    |         | INSULATOR                                    |
| - 30                       | 5252850        | 1                    |         | CAPACITOR                                    |
| - 31                       | 5276701        | 1                    |         | CONTACTOR,MAGNETIC 24 VDC                    |
| - 32                       | 10170          | 2                    |         | SCREW,BD HD- 6-32 X 0.250 LG ATT PT          |
| - 33                       | 2542049        | 1                    |         | RESISTOR,DIODE ASM WITH SPADE TERMINALS      |
| - 34                       | 4135138        | 1                    |         | GROUNDING                                    |
| - 35                       | 179946         | 1                    |         | HOLDER,FUSE                                  |
| - 36                       | 78999          | 1                    |         | FUSE   |
| - 37                       | 108615         | 1                    |         | FUSEHOLDER                                   |
| - 38                       | 107666         | 1                    |         | FUSE,CRTGGE 15 AMF ATT PT                    |
| - 39                       | 38352          | 2                    |         | SCREW,BD HD- 6-32 X 0.375 LG                 |
| - 40                       | 438567         | 1                    |         | SCREW,BD HD- 6-32 X 1.000 LG ATT PT          |
| - 41                       | 257187         | 1                    |         | NUT,HEX- 6-32                                |
| - 42                       | 55726          | 1                    |         | SCREW,BD HD- 6-32 X 0.188 LG                 |
| - 43                       | 137193         | 1                    |         | SHIELD,TERMINAL BOARD 6 POSITION             |
| - 44                       | 35739          | 1                    |         | SCREW,BD HD- 6-32 X 0.438 LG                 |
| - 45                       | 367115         | 1                    |         | JUMPER                                       |
| - 47                       | 210883         | 2                    |         | STUD   |
| - 48                       | 502590         | 1                    |         | BLOCK,TERMINAL- 6 POS                        |
| - 49                       | 8029971        | 1                    |         | STRIP,MARKER                                 |
| - 50                       | 35739          | 2                    |         | SCREW,BD HD- 6-32 X 0.438 LG ATT PT          |
| - 51                       | 317485         | 1                    |         | BLACK  |
| - 52                       | 527916         | 1                    |         | STRIP,MARKER                                 |

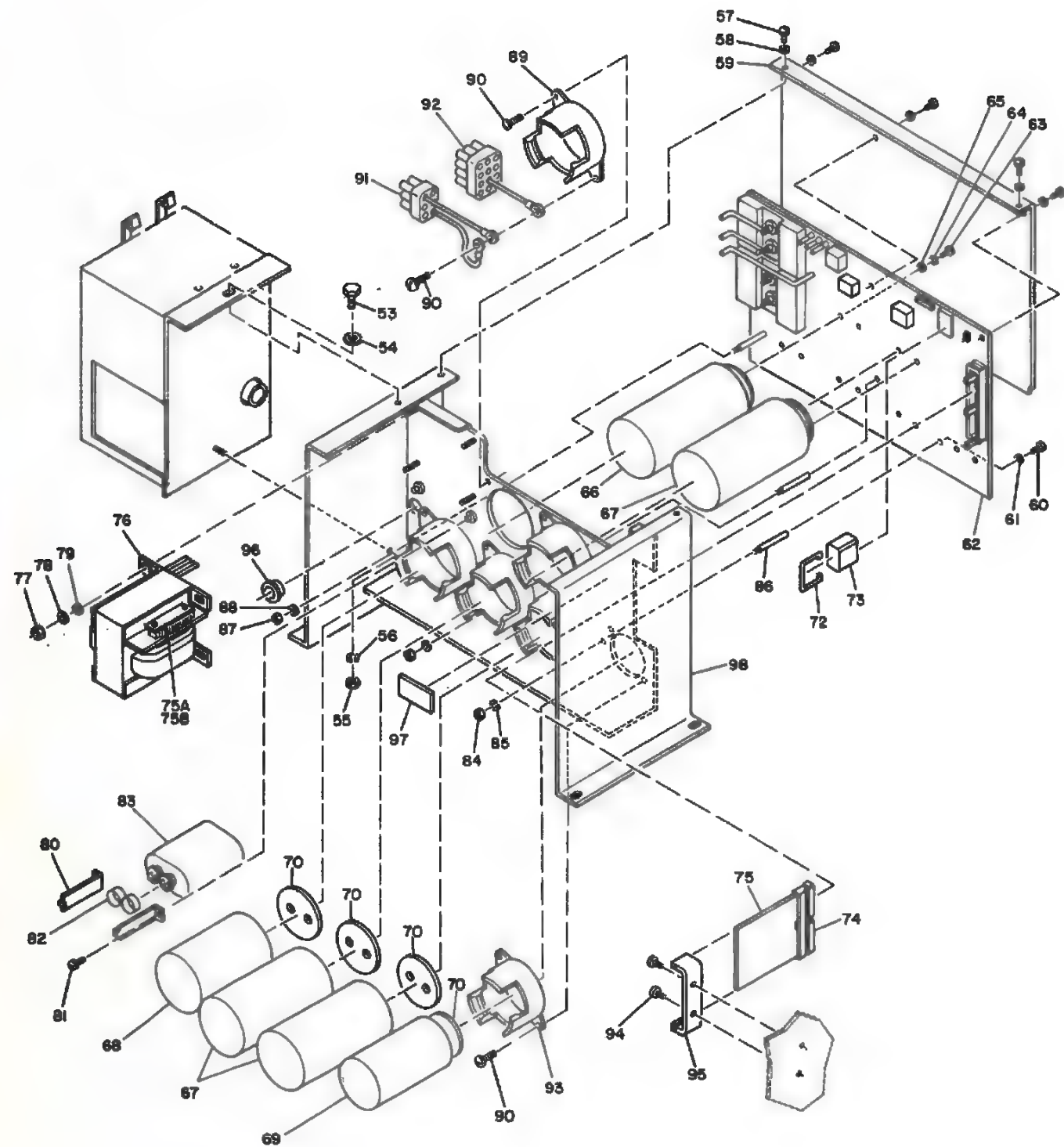
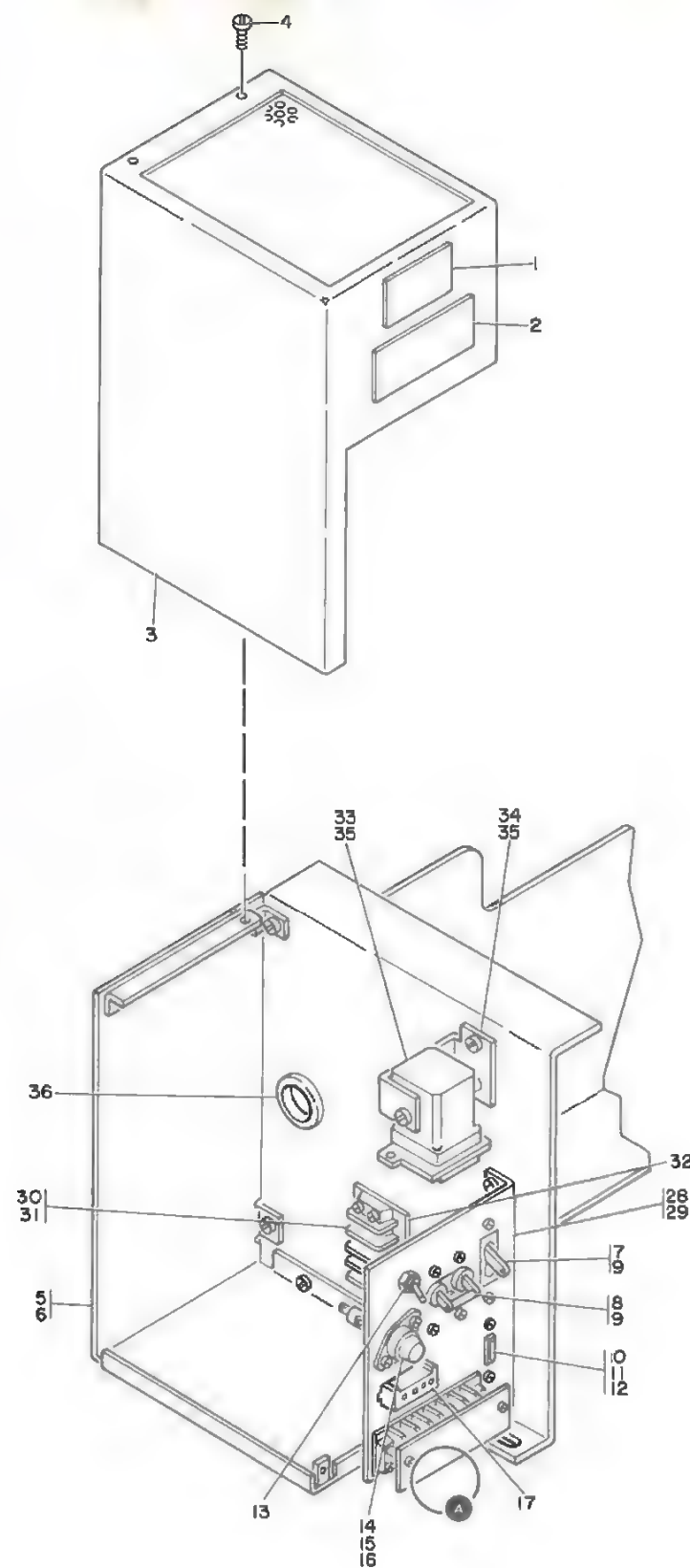
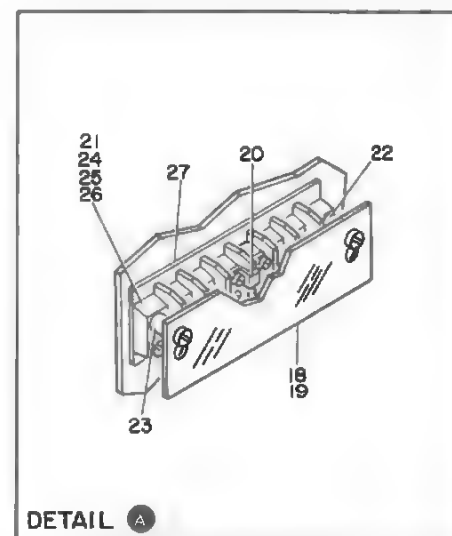


FIGURE 9. TRI-LEVEL POWER SUPPLY ASSEMBLY. SHEET 2 OF 2. INDEX NOS. 53-98. SEE LIST 9.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                                |   |   |   |        |
|----------------------------|----------------|----------------------|--|---|---|---|--------|
|                            |                |                      | 1  | 2 | 3 | 4 |        |
| 9 - 53                     | 36044          | 1                    | . SCREW,CAP SLOT HD- 1/4-20 X 0.500 LG     |   |   |   | ATT PT |
| - 54                       | 3550           | 1                    | . WASHER,FL- 0.250 ID X 0.562 OD           |   |   |   |        |
| - 55                       | 36109          | 1                    | . NUT,HEX- 1/4-20 THD                      |   |   |   | ATT PT |
| - 56                       | 76574          | 1                    | . LOCKWASHER,EXT TEETH- 0.256 ID X 0.510 O |   |   |   |        |
| - 57                       | 10170          | 5                    | . SCREW,BD HD- 6-32 X 0.250 LG             |   |   |   | ATT PT |
| - 58                       | 257986         | 5                    | . WASHER,FL- 0.156 ID X 0.312 OD           |   |   |   | ATT PT |
| - 59                       | 4135134        | 1                    | . COVER                                    |   |   |   |        |
| - 60                       | 38235          | 3                    | . SCREW,BD HD- 6-32 X 0.312 LG             |   |   |   | ATT PT |
| - 61                       | 257986         | 3                    | . WASHER,FL- 0.156 ID X 0.312 OD           |   |   |   | ATT PT |
| - 62                       | 5864584        | 1                    | . CONTROL BOARD ASM                        |   |   |   |        |
| - 63                       | 32042          | 12                   | . SCREW,BD HD- 10-32 X 0.375 LG            |   |   |   | ATT PT |
| - 64                       | 56079          | 12                   | . LOCKWASHER,EXT TEETH- 0.204 ID X 0.410 O |   |   |   | ATT PT |
| - 65                       | 45690          | 12                   | . WASHER,FL- 0.203 ID X 0.438 OD           |   |   |   |        |
| - 66                       | 5252526        | 1                    | . CAPACITOR,ELECTROLYIC                    |   |   |   |        |
| - 67                       | 5252740        | 3                    | . CAPACITOR                                |   |   |   |        |
| - 68                       | 5214505        | 1                    | . CAPACITOR                                |   |   |   |        |
| - 69                       | 5214366        | 1                    | . CAPACITOR- 24000 MF,P75M 10%             |   |   |   |        |
| - 70                       | 5323562        | 1                    | . SHIELD,CAPACITOR                         |   |   |   |        |
| - 71                       | 631769         | 5                    | . SHIELD,CAPACITOR                         |   |   |   |        |
| - 72                       | 5318966        | 1                    | . RETAINER,RELAY                           |   |   |   | ATT PT |
| - 73                       | 5318968        | 1                    | . RELAY                                    |   |   |   |        |
| - 74                       | 5318968        | 1                    | . RELAY                                    |   |   |   |        |
| - 75                       | 8525989        | 1                    | . SENSE CARD                               |   |   |   |        |
| - 75A                      | 5236656        | 1                    | . COVER,TERMINAL BLOCK                     |   |   |   |        |
| - 75B                      | 10170          | 2                    | . SCREW,BD HD- 6-32 X 0.250 LG             |   |   |   | ATT PT |
| - 76                       | 4119489        | 1                    | . TRANSFORMER 50HZ                         |   |   |   |        |
| - 76                       | 4135144        | 1                    | . TRANSFORMER,60 HZ                        |   |   |   |        |
| - 77                       | 11598          | 4                    | . NUT,HEX- 10-32                           |   |   |   | ATT PT |
| - 78                       | 56079          | 4                    | . LOCKWASHER,EXT TEETH- 0.204 ID X 0.410 O |   |   |   | ATT PT |
| - 79                       | 45690          | 4                    | . WASHER,FL- 0.203 ID X 0.438 OD           |   |   |   | ATT PT |
| - 80                       | 621446         | 2                    | . BRACKET,CAPACITOR MOUNTING               |   |   |   |        |
| - 81                       | 322552         | 2                    | . SCREW,BD HD- 6-32 X 0.875 LG             |   |   |   | ATT PT |
| - 82                       | 526378         | 2                    | . INSULATOR                                |   |   |   |        |
| - 83                       | 5252839        | 1                    | . CAPACITOR                                |   |   |   |        |
| - 84                       | 257189         | 3                    | . NUT,HEX- 8-32                            |   |   |   | ATT PT |
| - 85                       | 1090873        | 3                    | . LOCKWASHER,SPLIT- 0.168 ID X 0.296 OD    |   |   |   | ATT PT |
| - 86                       | 4135151        | 3                    | . STANDOFF                                 |   |   |   |        |
| - 87                       | 36109          | 1                    | . NUT,HEX- 1/4-20                          |   |   |   | ATT PT |
| - 88                       | 6935           | 1                    | . LOCKWASHER,SPLIT- 0.250 ID X 0.493 OD    |   |   |   | ATT PT |
| - 89                       | 4135153        | 5                    | . BRACKET                                  |   |   |   |        |
| - 90                       | 34512          | 12                   | . SCREW,BD HD- 8-32 X 0.375 LG             |   |   |   | ATT PT |
| - 91                       | 5576689        | 1                    | . GROUND CONNECTOR ASM                     |   |   |   |        |
| - 92                       | 5576690        | 1                    | . GROUND CONNECTOR ASM                     |   |   |   |        |
| - 93                       | 4135152        | 1                    | . CLAMP,CAPACITOR                          |   |   |   |        |
| - 94                       | 10170          | 2                    | . SCREW,BD HD- 6-32 X 0.250 LG             |   |   |   | ATT PT |
| - 95                       | 4135142        | 1                    | . CARD GUIDE                               |   |   |   |        |
| - 96                       | 5762057        | 1                    | . GROMMET,SNAP BUSHING                     |   |   |   |        |
| - 97                       | 5240513        | 1                    | . P/S LABEL 50HZ                           |   |   |   |        |
| - 97                       | 801652         | 1                    | . P/S LABEL 60HZ                           |   |   |   |        |
| - 98                       | 4135131        | 1                    | . CHASSIS                                  |   |   |   |        |



NEW STYLE



TRI-LEVEL POWER SUPPLY ASSEMBLY 50/60 HZ

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |   |   |        |
|----------------------------|----------------|----------------------|--|---|---|--------|
|                            |                |                      | 1  | 2 | 3 | 4      |
| 9A-                        | 5593470        | REF                  | TRI-LEVEL POWER SUPPLY ASSEMBLY 50/60 HZ<br>FOR NEXT HIGHER ASM SEE FIGURE 1-185<br>FOR ILLUSTRATION SEE FIGURE 9A |   |   |        |
| - 1                        | 2542403        | 1                    | . LABEL,FUSE WARNING   |   |   |        |
| - 2                        | 5593492        | 1                    | . LABEL,FUSE   |   |   |        |
| - 3                        | 5593475        | 1                    | . COVER  |   |   |        |
| - 4                        | 316807         | 3                    | . SCREW,PH- 6-32 X 0.375 LG  |   |   |        |
| - 5                        | 5593476        | 1                    | . COVER,BOTTOM   |   |   | ATT PT |
| - 6                        | 10170          | 4                    | . SCREW,BD HD- 6-32 X 0.250 LG   |   |   | ATT PT |
| - 7                        | 5214000        | 1                    | . CIRCUIT BREAKER  |   |   |        |
| - 8                        | 2574126        | 1                    | . CIRCUIT BREAKER  |   |   |        |
| - 9                        | 55726          | 6                    | . SCREW,BD HD- 6-32 X 0.188 LG   |   |   | ATT PT |
| - 10                       | 5593482        | 1                    | . CABLE ASM-POWER SUPPLY TO FAN<br>FOR COMPONENT PARTS SEE FIGURE 12   |   |   |        |
| - 11                       | 322065         | 2                    | . SCREW,BD HD- 6-32 X 0.625 LG   |   |   | ATT PT |
| - 12                       | 257187         | 2                    | . NUT,HEX- 6-32  |   |   | ATT PT |
| - 13                       | 5270314        | 1                    | . SWITCH   |   |   |        |
| - 14                       | 107666         | 1                    | . FUSE,CRTGGE 15 AMP   |   |   |        |
| - 15                       | 104615         | 1                    | . FUSEHOLDER   |   |   |        |
| - 16                       | 38352          | 2                    | . SCREW,BD HD- 6-32 X 0.375 LG   |   |   | ATT PT |
| - 17                       | 5593483        | 1                    | . CABLE ASM-POWER SUPPLY TO TRANSFORMER<br>FOR COMPONENT PARTS SEE FIGURE 12                                       |   |   |        |
| - 18                       | 337193         | 1                    | . SHIELD,TERMINAL BLOCK 6 POSITION   |   |   |        |
| - 19                       | 55726          | 2                    | . SCREW,BD HD- 6-32 X 0.188 LG   |   |   | ATT PT |
| - 20                       | 367115         | 1                    | . JUMPER,TERMINAL STRIP  |   |   |        |
| - 21                       | 502590         | 1                    | . BLOCK,TERMINAL- 6 POS  |   |   |        |
| - 22                       | 210883         | 1                    | . STUD   |   |   | ATT PT |
| - 23                       | 210884         | 1                    | . STUD   |   |   | ATT PT |
| - 24                       | 35739          | 1                    | . SCREW,BD HD- 6-32 X 0.438 LG   |   |   | ATT PT |
| - 25                       | 438567         | 1                    | . SCREW,BD HD- 6-32 X 1.000 LG   |   |   | ATT PT |
| - 26                       | 257187         | 1                    | . NUT,HEX- 6-32  |   |   | ATT PT |
| - 27                       | 8029971        | 1                    | . STRIP,MARKER   |   |   |        |
| - 28                       | 5593485        | 1                    | . PANEL-PRIMARY POWER  |   |   |        |
| - 29                       | 10170          | 2                    | . SCREW,BD HD- 6-32 X 0.250 LG   |   |   | ATT PT |
| - 30                       | 4701277        | 1                    | . BLOCK,TERMINAL   |   |   |        |
| - 31                       | 322550         | 4                    | . SCREW,BD HD- 6-32 X 0.500 LG   |   |   | ATT PT |
| - 32                       | 527916         | 1                    | . STRIP,MARKER   |   |   |        |
| - 33                       | 2242321        | 1                    | . RELAY  |   |   |        |
| - 34                       | 5593479        | 1                    | . BRACKET  |   |   |        |
| - 35                       | 10170          | 3                    | . SCREW,BD HD- 6-32 X 0.250 LG   |   |   | ATT PT |
| - 36                       | 4135138        | 1                    | . GROUND   |   |   |        |

FIGURE 9A. TRI-LEVEL POWER SUPPLY ASSEMBLY. SHEET 1 OF 2. INDEX NOS. 1-36. SEE LIST 9A.



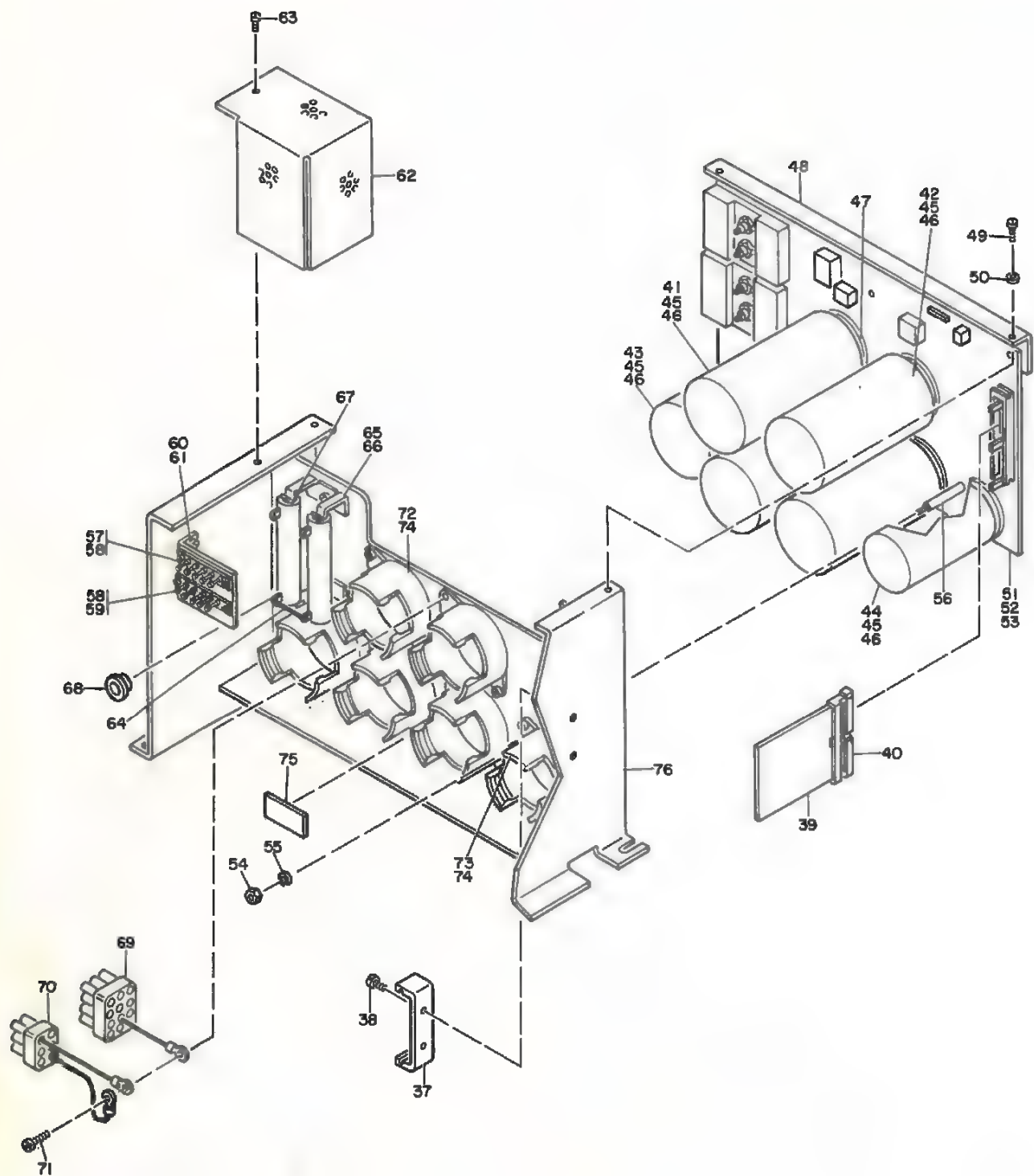


FIGURE 9A. TRI-LEVEL POWER SUPPLY ASSEMBLY. SHEET 2 OF 2. INDEX NOS. 37-76. SEE LIST 9A.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION                              |   |   |        |
|----------------------------|----------------|----------------------|--|---|---|--------|
|                            |                |                      | 1  | 2 | 3 | 4      |
| 9A- 37                     | 4135142        | 1                    | . CARD GUIDE                             |   |   |        |
| - 38                       | 10170          | 2                    | . SCREW,BD HD- 6-32 X 0.250 LG           |   |   |        |
| - 39                       | 8525989        | 1                    | . SENSE CARD                             |   |   | ATT PT |
| - 40                       | 811804         | 1                    | . GUIDE,CARD                             |   |   |        |
| - 41                       | 5252526        | 1                    | . CAPACITOR,ELECTROLYTIC                 |   |   |        |
| - 42                       | 5252740        | 3                    | . CAPACITOR                              |   |   |        |
| - 43                       | 5214505        | 1                    | . CAPACITOR                              |   |   |        |
| - 44                       | 5214073        | 1                    | . CAPACITOR                              |   |   |        |
| - 45                       | 32042          | 12                   | . SCREW,BD HD- 10-32 X 0.375 LG          |   |   | ATT PT |
| - 46                       | 2125974        | 12                   | . SPACER                                 |   |   | ATT PT |
| - 47                       | 631769         | 5                    | . SHIELD,CAPACITOR                       |   |   |        |
| - 47                       | 5325562        | 1                    | . SHIELD,CAPACITOR-USED WITH CAP 5214073 |   |   |        |
| - 48                       | 5593477        | 1                    | . BRACKET                                |   |   |        |
| - 49                       | 10170          | 5                    | . SCREW,BD HD- 6-32 X 0.250 LG           |   |   | ATT PT |
| - 50                       | 257986         | 5                    | . WASHER,FL- 0.156 ID X 0.312 OD         |   |   | ATT PT |
| - 51                       | 5593490        | 1                    | . BOARD ASM                              |   |   |        |
| - 52                       | 38235          | 3                    | . SCREW,BD HD- 6-32 X 0.312 LG           |   |   | ATT PT |
| - 53                       | 257986         | 3                    | . WASHER,FL- 0.156 ID X 0.312 OD         |   |   | ATT PT |
| - 54                       | 1090873        | 3                    | . LOCKWASHER,SPLIT- 0.168 ID X 0.296 OD  |   |   | ATT PT |
| - 55                       | 257189         | 3                    | . NUT,HEX- 8-32                          |   |   | ATT PT |
| - 56                       | 4135151        | 3                    | . STANDOFF                               |   |   |        |
| - 57                       | 5593488        | 1                    | . CABLE ASM-TEST POINT                   |   |   |        |
| - 58                       | 5553489        | 1                    | . CABLE ASM-TEST POINT                   |   |   |        |
| - 59                       | 438548         | 4                    | . FOR COMPONENT PARTS SEE FIGURE 12A     |   |   |        |
| - 60                       | 5593486        | 1                    | . SCREW,BD HD- 4-40 X 0.188 LG           |   |   | ATT PT |
| - 61                       | 10170          | 2                    | . BRACKET-TEST POINT MOUNTING            |   |   | ATT PT |
| - 62                       | 5593478        | 1                    | . SCREW,BD HD- 6-32 X 0.250 LG           |   |   |        |
| - 63                       | 38235          | 1                    | . COVER,RESISTOR                         |   |   | ATT PT |
| - 64                       | 103079         | 1                    | . SCREW,BD HD- 6-32 X 0.312 LG           |   |   |        |
| - 65                       | 5593484        | 1                    | . WIRE BARE                              |   |   |        |
| - 66                       | 38235          | 2                    | . BRACKET                                |   |   |        |
| - 67                       | 2122128        | 2                    | . SCREW,BD HD- 6-32 X 0.312 LG           |   |   | ATT PT |
| - 68                       | 4135138        | 1                    | . RESISTOR,FXD 10 OHMS P/H 5% 50W        |   |   |        |
| - 69                       | 5576690        | 1                    | . GROMMET                                |   |   |        |
| - 70                       | 5576689        | 1                    | . GROUND CONNECTOR ASM                   |   |   |        |
| - 71                       | 81693          | 1                    | . GROUND CONNECTOR ASM                   |   |   |        |
| - 72                       | 4135153        | 5                    | . SCREW,BD HD- 6-32 X 0.375 LG           |   |   |        |
| - 73                       | 4135152        | 1                    | . CLAMP                                  |   |   |        |
| - 74                       | 81693          | 1                    | . CLAMP USED WITH SHIELD 5323562         |   |   |        |
| - 75                       | 801652         | 11                   | . SCREW,BD HD- 6-32 X 0.375 LG           |   |   | ATT PT |
| - 76                       | 5593474        | 1                    | . LABEL                                  |   |   |        |
|                            |                |                      | . CHASSIS                                |   |   |        |

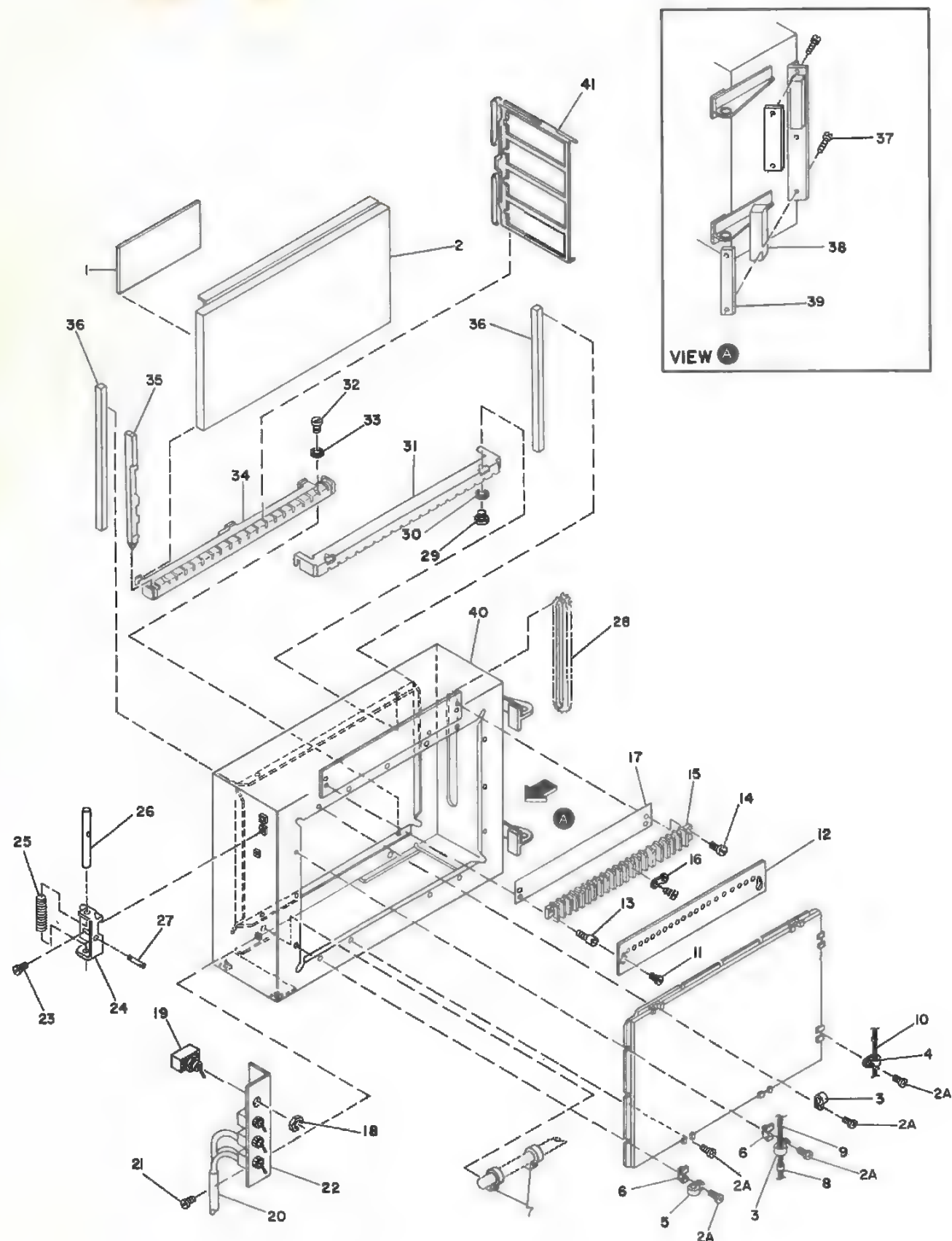


FIGURE 10. LOGIC CHASSIS ASSEMBLY. SEE LIST 10.

# LOGIC CHASSIS ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |
|----------------------------|----------------|----------------------|--|
| 10 -                       | 1819740        | REF                  | LOGIC CHASSIS ASSEMBLY<br>FOR NPVT HIGHER ASSEMBLY SEE FIGURE 2-66<br>FOR ILLUSTRATION SEE FIGURE 10 |
| - 1                        | 2648906        | 1                    | . LABEL  |
| - 2                        | 6808541        | 1                    | . COVER ASM  |
| - 2A                       | 811417         | 8                    | . SCREW, HEX SOCKET HD 6-32 X 0.500 LG   |
| - 3                        | 804109         | 4                    | . CLAMP  |
| - 4                        | 2102364        | 1                    | . CLAMP  |
| - 5                        | 2102364        | 1                    | . CLAMP  |
| - 6                        | 813179         | 8                    | . CLAMP  |
| - 7                        | 2162907        | 2                    | . CLAMP  |
| - 8                        | 524519         | 8                    | . TIF, CABLE   |
| - 9                        | 4138334        | 1                    | . CABLE ASM<br>FOR COMPONENT PARTS SEE FIGURE 12   |
| - 10                       | 5576691        | 1                    | . CABLE ASM<br>FOR COMPONENT PARTS SEE FIGURE 12   |
| - 11                       | 10170          | 2                    | . SCREW  |
| - 12                       | 5824095        | 1                    | . COVER  |
| - 13                       | 210883         | 2                    | . STUD   |
| - 14                       | 322550         | 2                    | . SCREW  |
| - 15                       | 253220         | 1                    | . TERMINAL STRIP   |
| - 16                       | 367115         | 12                   | . TERMINAL STRIP   |
| - 17                       | 242260         | 1                    | . MARKER STRIP   |
| - 18                       | 179743         | 4                    | . NUT, HEX, TOGGLE SW HLDG-0.469-32  |
| - 19                       | 738827         | 4                    | . SWITCH   |
| - 20                       | 5593453        | 1                    | . CABLE ASM<br>FOR COMPONENT PARTS SEE FIGURE 12   |
| - 21                       | 58207          | 2                    | . SCREW  |
| - 22                       | 4135069        | 1                    | . BRACKET  |
| - 23                       | 34512          | 2                    | . SCREW  |
| - 24                       | 1796730        | 1                    | . HOUSING  |
| - 25                       | 220856         | 1                    | . SPRING   |
| - 26                       | 204499         | 1                    | . PIN, GATE LATCH  |
| - 27                       | 204500         | 1                    | . STUD- 8-32 X 1.375 LG  |
| - 28                       | 825880         | 1                    | . TAPE, FOAM   |
| - 29                       | 811417         | 2                    | . SCREW  |
| - 30                       | 257986         | 2                    | . WASHER   |
| - 31                       | 819268         | 1                    | . UPPER GUIDE  |
| - 32                       | 811417         | 2                    | . SCREW  |
| - 33                       | 257986         | 2                    | . WASHER   |
| - 34                       | 819269         | 1                    | . LOWER GUIDE  |
| - 35                       | 819284         | 2                    | . INTERMIX BRACKETS  |
| - 36                       | 817905         | 2                    | . SEAL   |
| - 37                       | 186933         | 4                    | . SCREW  |
| - 38                       | 5593416        | 4                    | . MAT  |
| - 39                       | 5593415        | 2                    | . PLATE  |
| - 40                       | 1819766        | 1                    | . PLATE  |
| - 41                       | 818002         | AR                   | . GUIDE, CARD- 3 HIGH 2 WIDE   |
| - 41                       | 819408         | AR                   | . GUIDE, CARD- 3 HIGH 4 WIDE   |
| - 41                       | 2766709        | AR                   | . GUIDE, CARD- 3 HIGH 4 WIDE WITH TCP CONN   |

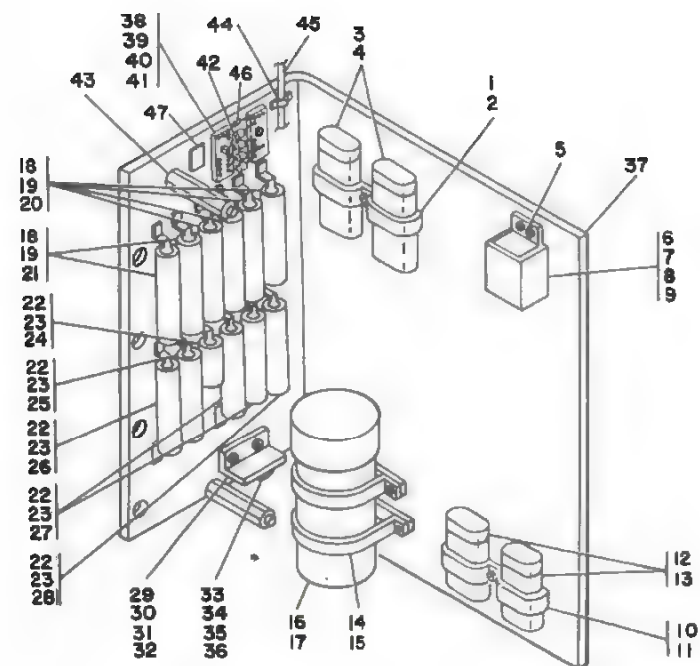


FIGURE 11. POWER PLATE ASSEMBLY. SEE LIST 11.

POWER PLATE ASSEMBLY

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |
|----------------------------|----------------|----------------------|--|
| 11 -                       | 1819731        | REF                  | POWER PLATE ASSEMBLY<br>FOR NEXT HIGHER ASSEMBLY SEE FIGURE 2-83<br>FOR ILLUSTRATION SEE FIGURE 11 |
| - 1                        | 58207          | 1                    | . SCREW,BD HD- 8-32 X 0.250 LG   |
| - 2                        | 1811047        | 1                    | . CLAMP  |
| - 3                        | 5252809        | 6                    | . CAPACITOR,8.0 MFD  |
| - 4                        | 363001         | 1                    | . BOOT   |
| - 5                        | 58207          | 2                    | . SCREW,BD HD- 8-32 X 0.250 LG   |
| - 6                        | 1811048        | 1                    | . BRACKET,SWITCH   |
| - 7                        | 2410111        | 1                    | . RELAY, 245 OHMS 24VDC  |
| - 8                        | 52684          | 4                    | . SCREW,BD HD- 3-48 X 0.125 LG   |
| - 9                        | 1812598        | 1                    | . COVER  |
| - 10                       | 186759         | 1                    | . SCREW,BD HD- 8-32 X 0.312 LG   |
| - 11                       | 4703211        | 1                    | . CLAMP  |
| - 12                       | 5252810        | 1                    | . CAPACITOR,PAPER AC- 10 MFD 330 VACW  |
| - 13                       | 363001         | 1                    | . BOOT   |
| - 14                       | 58207          | 2                    | . SCREW,BD HD- 8-32 X 0.250 LG   |
| - 15                       | 4135005        | 2                    | . CLAMP  |
| - 16                       | 5252740        | 1                    | . CAPACITOR  |
| - 17                       | 4135099        | 1                    | . COVER  |
| - 18                       | 58207          | 1                    | . SCREW,BD HD- 8-32 X 0.250 LG   |
| - 19                       | 510316         | 2                    | . BRACKET  |
| - 20                       | 5615309        | 1                    | . RESISTOR   |
| - 21                       | 5615879        | 1                    | . RESISTOR   |
| - 22                       | 58207          | 2                    | . SCREW,BD HD- 8-32 X 0.250 LG   |
| - 23                       | 510316         | 2                    | . BRACKET  |
| - 24                       | 507142         | 1                    | . RESISTOR,100 OHMS 25W  |
| - 25                       | 5615311        | 1                    | . RESISTOR   |
| - 26                       | 5615311        | 1                    | . RESISTOR   |
| - 27                       | 5615309        | 1                    | . RESISTOR   |
| - 28                       | 5615592        | 1                    | . RESISTOR   |
| - 29                       | 34512          | 2                    | . SCREW,BD HD- 8-32 X 0.375 LG   |
| - 30                       | 1819757        | 1                    | . BRACKET  |
| - 31                       | 300606         | 2                    | . WASHER,INSULATING- 0.169 ID X 0.437 OD   |
| - 32                       | 1073412        | 2                    | . INSULATOR  |
| - 33                       | 81693          | 2                    | . SCREW,BD HD- 6-32 X 0.375 LG   |
| - 34                       | 62031          | 2                    | . LOCKWASHER,INT TEETH- 0.150 ID X 0.295 OD  |
| - 35                       | 257187         | 2                    | . NUT,HEX- 6-32  |
| - 36                       | 369646         | 1                    | . SEMICONDUCTOR DEVICE,DIODE TYPE FN   |
| - 37                       | 1819730        | 1                    | . PLATE  |
| - 38                       | 438549         | 2                    | . SCREW,BD HD- 4-40 X 0.437 LG   |
| - 39                       | 205331         | 3                    | . JUMPER   |
| - 40                       | 302131         | 2                    | . STRIP,INSULATOR 2.094 LG   |
| - 41                       | 302090         | 2                    | . BLOCK,TERMINAL   |
| - 42                       | 639292         | 4                    | . RESISTOR,WIREWOUND- 100 OHMS 10W   |
| - 43                       | 801731         | 2                    | . HEX STANDOFF   |
| - 44                       | 524519         | 3                    | . TIE,CABLE  |
| - 45                       | 1815152        | 1                    | . CABLE ASM  |
| - 46                       | 615354         | 1                    | . DIODE ASSEMBLY,AM  |
| - 47                       | 5593422        | 1                    | . LABEL  |



## CABLE AND JUMPER ASM COMPONENT PARTS

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION |                                   |  |   |
|----------------------------|----------------|----------------------|-------------|-----------------------------------|--|---|
|                            |                |                      | 1           | 2                                 | 3  | 4 |
| 12 -                       | 1815065        | REF                  | CABLE       | ASH, AC I/O                       | FOR COMPONENT PARTS SEE INDEXES -6       |   |
| -                          | 1815066        | REF                  | CABLE       | ASH, DC I/O                       | FOR COMPONENT PARTS SEE INDEXES -8,-9,   |   |
| -                          | 1815152        | REF                  | CABLE       | ASH, DC TO MOTORS                 | FOR COMPONENT PARTS SEE INDEXES 3,3A,4,  |   |
| -                          | 1819739        | REF                  | CABLE       | ASH, CORD-ATTACHMENT              | FOR COMPONENT PARTS SEE INDEXES -10      |   |
| -                          | 4134969        | REF                  | CABLE       | ASH, AC SW TO POWER SUPPLY        | FOR COMPONENT PARTS SEE INDEX -8         |   |
| -                          | 4134970        | REF                  | CABLE       | ASH, DC INTERNAL +24V,+8.5V,+5VDC | FOR COMPONENT PARTS SEE INDEXES -8,      |   |
| -                          | 4135102        | REF                  | CABLE       | ASH, POWER SUPPLY SIGNAL          | FOR COMPONENT PARTS SEE INDEXES -16,     |   |
| -                          | 4138334        | REF                  | CABLE       | ASH                               | FOR COMPONENT PARTS SEE INDEXES -37,     |   |
| -                          | 4138336        | REF                  | CABLE       | ASH, PS TO GATE FAN               | FOR COMPONENT PARTS SEE INDEXES -24,     |   |
| -                          | 4138338        | REF                  | CABLE       | ASH, AC LINE FLR TO PS            | FOR COMPONENT PARTS SEE INDEXES -8       |   |
| -                          | 5576641        | REF                  | CABLE       | ASH, CONVENIENCE OUTLET 60HZ      | FOR COMPONENT PARTS SEE INDEXES -1,      |   |
| -                          | 5576678        | REF                  | CABLE       | ASH, CORD-ATTACHMENT-UTC          | FOR COMPONENT PARTS SEE INDEX -10        |   |
| -                          | 5576689        | REF                  | GROUND      | CONNECTOR ASH 8.5V AND 5V         | FOR COMPONENT PARTS SEE INDEXES -25      |   |
| -                          | 5576690        | REF                  | GROUND      | CONNECTOR ASH 25V AT 15A          | FOR COMPONENT PARTS SEE INDEXES -26      |   |
| -                          | 5576691        | REF                  | CABLE       | ASH                               | FOR COMPONENT PARTS SEE INDEX -8         |   |
| -                          | 1815149        | REF                  | CABLE       | ASH, HAMMER MAGNETS-UPPER BANK    | FOR COMPONENT PARTS SEE INDEXES          |   |
| -                          | 1815150        | REF                  | CABLE       | ASH, HAMMER MAGNETS-LOWER BANK    | FOR COMPONENT PARTS SEE INDEXES -3A,-45  |   |
| -                          | 1815151        | REF                  | CABLE       | ASH, SIGNAL                       | FOR COMPONENT PARTS SEE INDEXES -3,-16,  |   |
| -                          | 4134971        | REF                  | CABLE       | ASH, SIGNAL I/C                   | FOR COMPONENT PARTS SEE INDEXES -16,-17, |   |
| -                          | 4135130        | REF                  | CABLE       | ASH, CORD-ATTACHMENT-1828.8       | FOR COMPONENT PARTS SEE INDEXES -10,     |   |
| -                          | 5576620        | REF                  | CABLE       | ASH, OP PANEL TO LOGIC GATE       | FOR COMPONENT PARTS SEE INDEXES -16,-17, |   |
| -                          | 5576687        | REF                  | CABLE       | ASH, OUTLET-50 HZ                 | FOR COMPONENT PARTS SEE INDEXES -1,-2,   |   |
| -                          | 5593412        | REF                  | CABLE       | ASH, HAMMER UNIT 25 VOLT          | FOR COMPONENT PARTS SEE INDEXES -9       |   |
| -                          | 5593453        | REF                  | CABLE       | ASH, FE SWITCHES                  | FOR COMPONENT PARTS SEE INDEXES -17,-32, |   |
| -                          | 5593482        | REF                  | CABLE       | ASH-FAN TO POWER SUPPLY           | FOR COMPONENT PARTS SEE INDEXES -7A,-18  |   |
| -                          | 5593483        | REF                  | CABLE       | ASH-TRANSFORMER TO POWER SUPPLY   | FOR COMPONENT PARTS SEE INDEXES -11A,-18 |   |

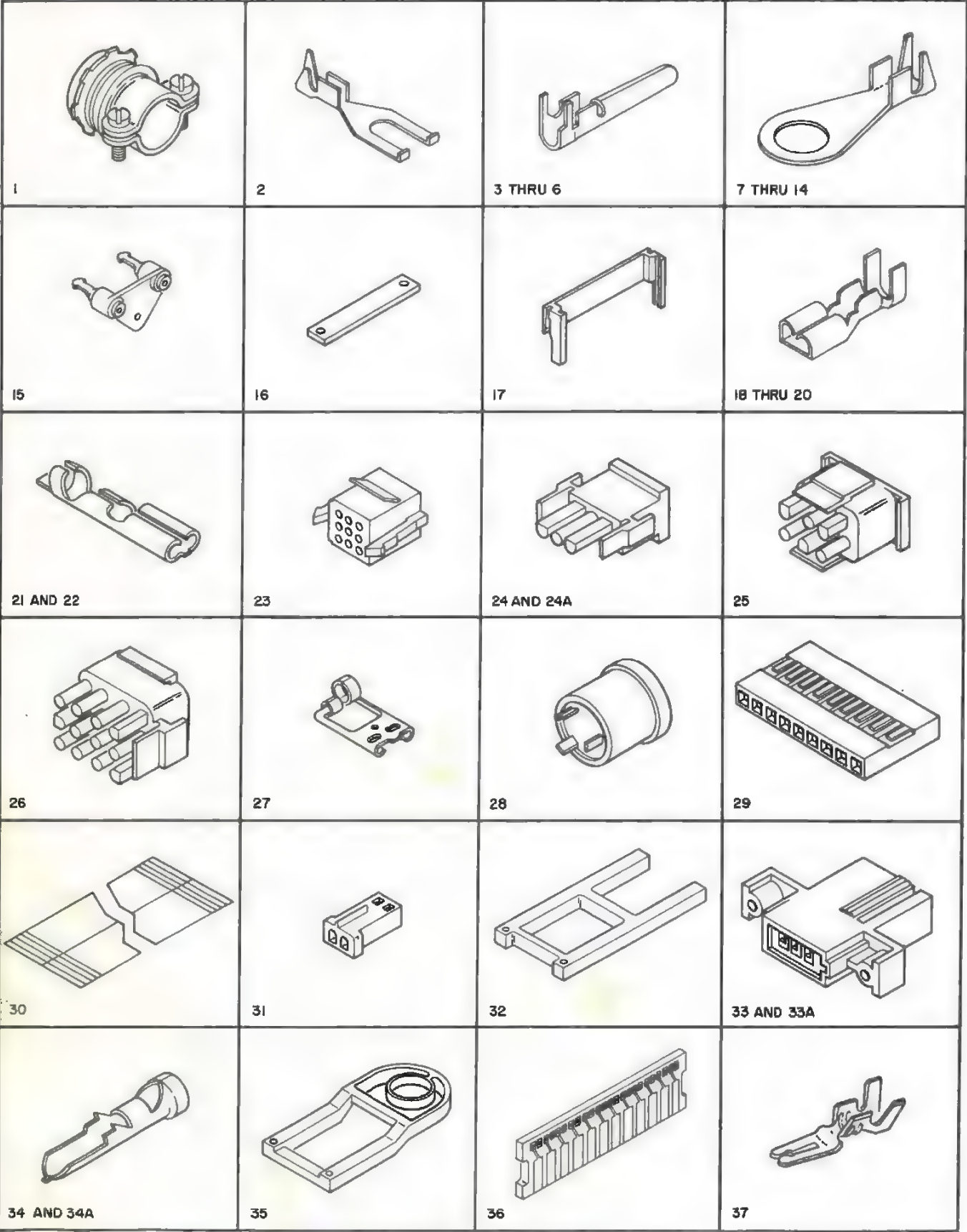


FIGURE 12. CABLE AND JUMPER ASSEMBLY COMPONENT PARTS. SHEET. 1 OF 3. INDEX NOS. 1-37. SEE LIST 12.

CABLE AND JUMPER ASM COMPONENT PARTS

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION  |
|----------------------------|----------------|----------------------|--|
| 12 -                       | 5593488        | REF                  | CABLE ASM-TEST POINT<br>FOR COMPONENT PARTS SEE INDEXES -4A<br>AND -54 |
| -                          | 5593489        | REF                  | CABLE ASM-TEST POINT<br>FOR COMPONENT PARTS SEE INDEXES -4A<br>AND -54 |
| - 1                        | 151598         | AR                   | CLAMP  |
| - 2                        | 483652         | AR                   | TERMINAL, FLANGED SPACE- 14-16AWG                                      |
| - 3                        | 483657         | AR                   | TERMINAL, TAPER PIN  |
| - 3A                       | 483658         | AR                   | TERMINAL, TAPER PIN 18-20 AWG  |
| - 4                        | 483659         | AR                   | TERMINAL, TAPER PIN- 22-26AWG  |
| - 5                        | 1847521        | AR                   | TERMINAL, SOCKET   |
| - 6                        | 1471019        | AR                   | TERMINAL, TAPER PIN  |
| - 7                        | 483676         | AR                   | TERMINAL, RING- 22-26 AWG  |
| - 7A                       | 483677         | AR                   | TERMINAL, RING, NO. 6 STUD, 18-20 AWG                                  |
| - 8                        | 483678         | AR                   | TERMINAL, RING 14-16 AWG   |
| - 9                        | 483679         | AR                   | TERMINAL, RING 10-12 AWG   |
| - 10                       | 483682         | AR                   | TERMINAL, RING 14-16 AWG   |
| - 11                       | 483683         | AR                   | TERMINAL, RING 10-12 AWG   |
| - 11A                      | 483685         | AR                   | TERMINAL, RING, NO. 10 STUD, 18-20 AWG                                 |
| - 12                       | 483686         | AR                   | TERMINAL, RING 14-16 AWG   |
| - 13                       | 483687         | AR                   | TERMINAL, RING 10-12 AWG   |
| - 14                       | 483689         | AR                   | TERMINAL, RING- 14-16AWG   |
| - 15                       | 725506         | AR                   | SOCKET, TRANSISTOR   |
| - 16                       | 740459         | AR                   | STIFFENER  |
| - 17                       | 811802         | AR                   | CARD GUIDE   |
| - 18                       | 1127037        | AR                   | TERMINAL, WIRE   |
| - 19                       | 2637682        | AR                   | CONNECTOR, WIRE (22 26 AWG)  |
| - 20                       | 430799         | AR                   | RECEPTACLE-TERMINAL  |
| - 21                       | 1166115        | AR                   | SOCKET   |
| - 22                       | 5412817        | AR                   | TERMINAL   |
| - 23                       | 1166498        | AR                   | HOUSING  |
| - 24                       | 1847526        | AR                   | CONNECTOR  |
| - 24A                      | 1847529        | AR                   | CONNECTOR-A POSITION   |
| - 25                       | 1847530        | AR                   | PLUG   |
| - 26                       | 1847534        | AR                   | PLUG   |
| - 27                       | 2162590        | AR                   | TERMINAL, FLAG FAST  |
| - 28                       | 2594759        | AR                   | CONNECTOR  |
| - 29                       | 2731852        | AR                   | HOUSING  |
| - 30                       | 4135136        | AR                   | LABEL, CONNECTOR   |
| - 31                       | 5214572        | AR                   | HOUSING, CONNECTOR- FEMALE   |
| - 32                       | 2744813        | AR                   | INSULATOR  |
| - 33                       | 5353853        | AR                   | HOUSING, CONNECTOR   |
| - 33A                      | 5353851        | AR                   | HOUSING, CONNECTOR   |
| - 34                       | 5353854        | AR                   | CONTACT, MALE 16-20 WIRE   |
| - 34A                      | 5353852        | AR                   | CONTACT, MALE  |
| - 35                       | 4124485        | AR                   | STRAIN RELIEF  |
| - 35                       | 5353922        | AR                   | STRAIN REL   |
| - 36                       | 5800634        | AR                   | CARD ASM   |
| - 37                       | 813194         | AR                   | TERMINAL   |

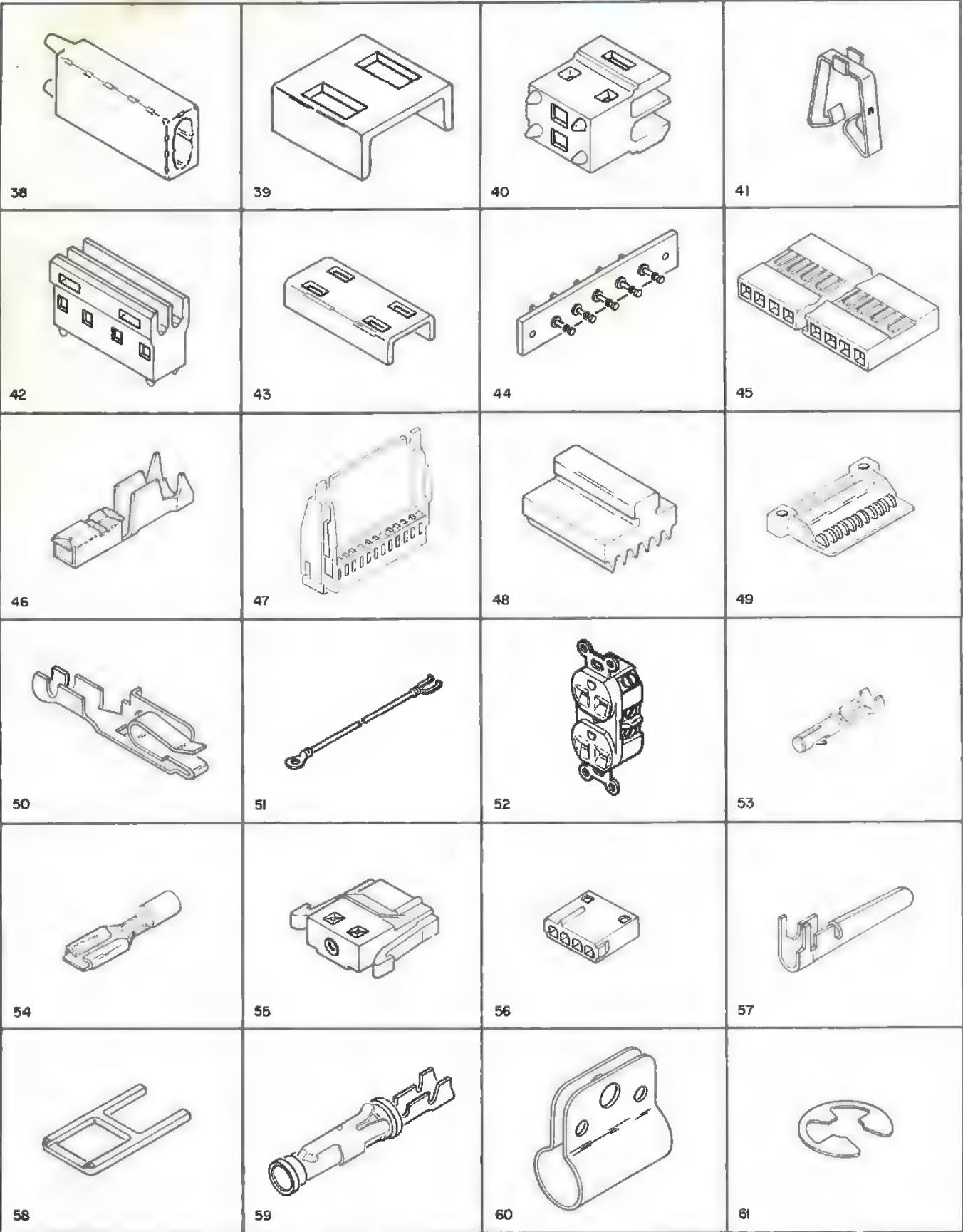


FIGURE 12. CABLE AND JUMPER ASSEMBLY COMPONENT PARTS. SHEET 2 OF 3. INDEX NOS. 38-61. SEE LIST 12.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION |   |   |   |
|----------------------------|----------------|----------------------|-------------|---|---|---|
|                            |                |                      | 1           | 2                                       | 3 | 4 |
| 12 - 38                    | 813197         | AR                   | .           | HOUSING                                 |   |   |
| - 39                       | 813549         | AR                   | .           | COVER                                   |   |   |
| - 40                       | 813550         | AR                   | .           | HOUSING                                 |   |   |
| - 41                       | 813681         | AR                   | .           | CONTACT                                 |   |   |
| - 42                       | 813801         | AR                   | .           | HOUSING                                 |   |   |
| - 43                       | 813802         | AR                   | .           | COVER,VOLTAGE CROSSOVER                 |   |   |
| - 44                       | 5593487        | AR                   | .           | STRIP,TURRET                            |   |   |
| - 45                       | 1800735        | AR                   | .           | HOUSING                                 |   |   |
| - 46                       | 1794724        | AR                   | .           | TERMINAL                                |   |   |
| - 47                       | 5447741        | AR                   | .           | HOUSING,SINGLE HI                       |   |   |
| - 48                       | 5466393        | AR                   | .           | CLAMP,STRAIN RELIEF                     |   |   |
| - 49                       | 5466397        | AR                   | .           | STRAIN RELIEF                           |   |   |
| - 50                       | 5486851        | AR                   | .           | CONTACT,SERPENT-SINGLE HI,22-26 ENG     |   |   |
| - 53                       | 2513254        | AR                   | .           | TERMINAL,SOCKET- 30-32 AWG              |   |   |
| - 54                       | 236916         | AR                   | .           | TERMINAL,CONTACT- FEMALE 24-22 AWG      |   |   |
| - 55                       | 1166116        | AR                   | .           | HOUSING                                 |   |   |
| - 56                       | 1812491        | AR                   | .           | HOUSING,FEMALE CONTACTS                 |   |   |
| - 57                       | 483661         | AR                   | .           | TERMINAL                                |   |   |
| - 58                       | 2744814        | AR                   | .           | STRAIN RELIEF                           |   |   |
| - 59                       | 1471028        | AR                   | .           | CONTACT                                 |   |   |
| - 60                       | 4037302        | AR                   | .           | CLAMP                                   |   |   |
| - 61                       | 264641         | AR                   | .           | RING,RETAINING EXT 0.114 ID X 0.025 THK |   |   |



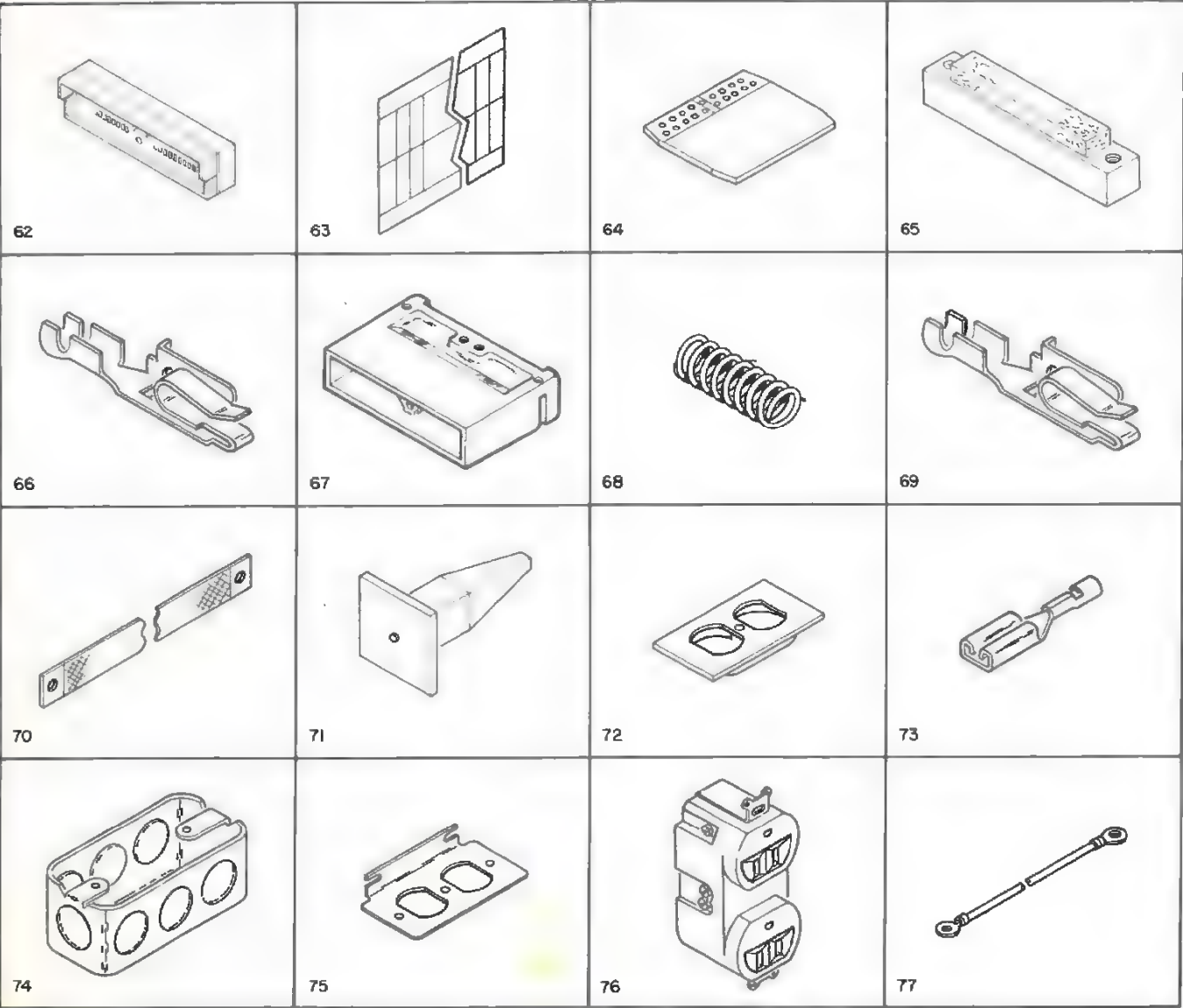


FIGURE 12. CABLE AND JUMPER ASSEMBLY COMPONENT PARTS. SHEET 3 OF 3. INDEX NOS. 62-77. SEE LIST 12.

| FIGURE-<br>INDEX<br>NUMBER | PART<br>NUMBER | UNITS<br>PER<br>ASM. | DESCRIPTION |  |   |   |  |
|----------------------------|----------------|----------------------|-------------|--|---|---|--|
|                            |                |                      | 1           | 2                                      | 3 | 4 |  |
| 12 - 62                    | 5353868        | AR                   | .           | CONNECTOR BLOCK,B-STYLE                |   |   |  |
| - 63                       | 483770         | AR                   | .           | LABEL                                  |   |   |  |
| - 64                       | 5353880        | AR                   | .           | CARD,SHIELD COMMONING                  |   |   |  |
| - 65                       | 5353896        | AR                   | .           | RELIEF ASSEMBLY,STRAIN                 |   |   |  |
| - 66                       | 5362301        | AR                   | .           | CONTACT,LARGE SERPENT,22-26 WIRE RANGE |   |   |  |
| - 67                       | 5362306        | AR                   | .           | COVER,CONNECTOR BLOCK                  |   |   |  |
| - 68                       | 1105806        | AR                   | .           | SPRING                                 |   |   |  |
| - 69                       | 5404480        | AR                   | .           | CONTACT,GREAT SNAKE,18-20 WIRE RANGE   |   |   |  |
| - 70                       | 2101840        | AR                   | .           | STRAP                                  |   |   |  |
| - 71                       | 2637689        | AR                   | .           | INSERT                                 |   |   |  |
| - 74                       | 194355         | AR                   | .           | OUTLET BOX                             |   |   |  |
| - 75                       | 4703239        | AR                   | .           | BRACKET                                |   |   |  |
| - 76                       | 357995         | AR                   | .           | OUTLET,CONV 115V 60 HZ                 |   |   |  |
| - 77                       | 1993937        | AR                   | .           | JUMPER ASM                             |   |   |  |

# NUMERICAL INDEX

| PART NO. | LIST AND INDEX NO. | PART NO. | LIST AND INDEX NO. | PART NO.   | LIST AND INDEX NO. | PART NO.   | LIST AND INDEX NO. | PART NO.   | LIST AND INDEX NO. | PART NO.    | LIST AND INDEX NO. | PART NO.    | LIST AND INDEX NO. | PART NO. | LIST AND INDEX NO. |
|----------|--------------------|----------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|-------------|--------------------|-------------|--------------------|----------|--------------------|
| 119      | 1 - 3D             | 9092     | 1 - 2              | 11598-COMT | 1 - 74             | 35739-COMT | 4 - 9              | 56079-COMT | 3 - 130            | 186758-COMT | 3 - 135            | 257982-COMT | 5 - 49             | 438542   | 5 - 56             |
| 195      | 3 - 7              |          | 1 - 6              |            | 1 - 78             |            | 9 - 44             |            | 9 - 25             |             | 4 - 31             | 257984      | 3 - 18             | 438544   | 2 - 150            |
|          | 3 - 48             |          | 1 - 38             |            | 1 - 82             |            | 9 - 50             |            | 9 - 64             | 186759      | 4 - 54             |             | 3 - 54             | 438548   | 9A - 59            |
| 324      | 2 - 2              |          | 1 - 44             |            | 1 - 95             |            | 9A - 24            |            | 9 - 78             |             | 4 - 56             | 257985      | 5 - 61             | 438549   | 3 - 25             |
|          | 5 - 79             |          | 1 - 48             |            | 1 - 99             | 36109      | 1 - 11             | 58207      | 1 - 14             |             | 11 - 10            |             | 3 - 4              |          | 3 - 126            |
|          | 5 - 85             |          | 1 - 53             |            | 1 - 120            |            | 9 - 55             |            | 1 - 34             | 186924      | 3 - 17             |             | 3 - 14             |          | 11 - 38            |
| 845      | 4 - 22             |          | 1 - 57             |            | 1 - 124            |            | 9 - 87             |            | 2 - 6              |             | 3 - 53             |             | 3 - 19             | 438550   | 3 - 61             |
| 1940     | 1 - 3              |          | 1 - 61             |            | 1 - 128            | 36112      | 1 - 8              |            | 2 - 66B            | 186929      | 5 - 32             |             | 3 - 44             | 438551   | 5 - 50             |
|          | 1 - 7              |          | 1 - 66             |            | 1 - 137P           | 36844      | 9 - 53             |            | 2 - 102            | 186931      | 5 - 21             |             | 3 - 51             | 438552   | 1 - 106            |
|          | 1 - 39             |          | 1 - 75             |            | 1 - 139            | 37913      | 1 - 107            |            | 3 - 28             |             | 7 - 3              |             | 3 - 55             |          | 3 - 13             |
|          | 1 - 45             |          | 1 - 79             |            | 1 - 160            |            | 3A - 8             |            | 3 - 122            | 186933      | 10 - 27            | 257986      | 2 - 66B            |          | 5 - 19             |
|          | 1 - 49             |          | 1 - 83             |            | 1 - 190            |            | 5 - 62             |            | 4 - 23             | 186950      | 2 - 188            |             | 3 - 90             | 438567   | 9 - 40             |
|          | 1 - 53A            |          | 1 - 96             |            | 1 - 196            | 38235      | 3A - 5             |            | 9 - 1              | 186952      | 4 - 60             |             | 3A - 3             |          | 9A - 25            |
|          | 1 - 56             |          | 1 - 100            |            | 1 - 200            |            | 5 - 64             |            | 10 - 21            | 194355      | 12 - 74            |             | 9 - 58             | 438586   | 4 - 62             |
|          | 1 - 76             |          | 1 - 110            |            | 1 - 210            |            | 5 - 76             |            | 11 - 1             | 204499      | 10 - 26            |             | 9 - 61             | 438588   | 4 - 44             |
|          | 1 - 80             |          | 1 - 121            |            | 1 - 216            |            | 8 - 19             |            | 11 - 5             | 204500      | 10 - 27            |             | 9A - 50            | 438589   | 5 - 35             |
|          | 1 - 84             |          | 1 - 125            |            | 1 - 231            |            | 9 - 60             |            | 11 - 14            | 204616      | 5 - 69             |             | 9A - 53            | 438602   | 3 - 129            |
|          | 1 - 85             |          | 1 - 129            |            | 1 - 237            |            | 9A - 52            |            | 11 - 18            | 205331      | 11 - 39            |             | 10 - 30            | 474405   | 1 - 66             |
|          | 1 - 122            |          | 1 - 136            |            | 1 - 241            |            | 9A - 63            |            | 11 - 22            | 209567      | 2 - 187            |             | 10 - 33            |          | 1 - 132            |
|          | 1 - 126            |          | 1 - 137D           |            | 2 - 1              |            | 9A - 66            |            | 11 - 34            | 210883      | 1 - 147            | 264641      | 12 - 61            |          | 1 - 204            |
|          | 1 - 130            |          | 1 - 140            |            | 2 - 14             | 38352      | 9 - 39             |            | 9 - 56             |             | 1 - 170            | 264998      | 4 - 17D            |          | 1 - 245            |
|          | 1 - 131            |          | 1 - 154            |            | 2 - 145            |            | 9A - 16            |            | 9 - 36             |             | 9 - 47             | 300606      | 11 - 31            | 483652   | 12 - 2             |
|          | 1 - 137            |          | 1 - 161            |            | 2 - 163            | 38364      | 2 - 175            |            | 4 - 14             |             | 9A - 22            | 302090      | 3 - 26             | 483657   | 12 - 3             |
|          | 1 - 137E           |          | 1 - 188            |            | 3A - 19            | 38381      | 1 - 135            |            | 9A - 71            |             | 10 - 13            |             | 3 - 125            | 483658   | 12 - 3A            |
|          | 1 - 141            |          | 1 - 197            |            | 5 - 70             | 38387      | 5 - 78             |            | 9A - 74            | 210884      | 9A - 23            |             | 11 - 41            | 483659   | 12 - 4             |
|          | 1 - 155            |          | 1 - 201            |            | 5 - 90             |            | 5 - 84             |            | 11 - 33            | 214439      | 2 - 30             | 302131      | 3 - 27             | 483661   | 12 - 57            |
|          | 1 - 162            |          | 1 - 208            |            | 9 - 24             | 38433      | 4 - 19C            |            | 6 - 2              |             | 2 - 68             |             | 3 - 124            | 483676   | 12 - 7             |
|          | 1 - 189            |          | 1 - 211            |            | 9 - 77             | 38443      | 1 - 149G           |            | 9A - 64            | 216323      | 3A - 17            |             | 11 - 40            | 483677   | 12 - 7A            |
|          | 1 - 192            |          | 1 - 217            |            | 2 - 167            | 38686      | 1 - 20             |            | 3 - 64             | 220856      | 10 - 25            | 307286      | 3 - 31             | 483678   | 12 - 8             |
|          | 1 - 198            |          | 1 - 229            |            | 1 - 3C             |            | 1 - 89A            |            | 9 - 37             | 221790      | 9 - 3              | 313385      | 3 - 129A           | 483679   | 12 - 9             |
|          | 1 - 202            |          | 1 - 232            |            | 1 - 36             |            | 1 - 185A           |            | 9A - 15            | 222696      | 2 - 16             | 316807      | 9A - 4             | 483682   | 12 - 10            |
|          | 1 - 203            |          | 1 - 238            |            | 3 - 22             |            | 2 - 73             |            | 7 - 25             | 225532      | 2 - 74             | 317131      | 1 - 146            | 483683   | 12 - 11            |
|          | 1 - 209            |          | 1 - 242            |            | 3 - 39             | 45671      | 2 - 118            |            | 6 - 30             | 234977      | 3 - 84             | 317227      | 2 - 52             | 483685   | 12 - 11A           |
|          | 1 - 230            |          | 2 - 13             |            | 3 - 58             | 45690      | 1 - 60             |            | 5 - 83             |             | 3 - 98             | 317310      | 1 - 169            | 483686   | 12 - 12            |
|          | 1 - 233            |          | 2 - 26             |            | 3 - 65             |            | 1 - 65             |            | 2 - 5              | 236550      | 5 - 67             | 317485      | 9 - 51             | 483687   | 12 - 13            |
|          | 1 - 239            |          | 2 - 35             |            | 3 - 115            |            | 1 - 97             |            | 5 - 89             | 236849      | 1 - 31             | 322065      | 3 - 89             | 483689   | 12 - 14            |
|          | 1 - 243            |          | 2 - 39             |            | 4 - 15             |            | 1 - 101            |            | 9 - 38             |             | 1 - 23             |             | 4 - 11             | 483770   | 12 - 63            |
|          | 1 - 244            |          | 2 - 43             |            | 4 - 27             |            | 1 - 111            |            | 9A - 14            |             | 1 - 27             |             | 9 - 20             | 502590   | 9 - 48             |
|          | 2 - 27             |          | 2 - 47             |            | 4 - 32             |            | 1 - 212            |            | 1 - 21A            |             | 1 - 31             |             | 9A - 11            |          | 9A - 21            |
|          | 2 - 36             |          | 2 - 54             |            | 5 - 11             |            | 1 - 218            |            | 1 - 1              | 113288      | 1 - 149C           | 322266      | 1 - 145            | 507142   | 11 - 24            |
|          | 2 - 40             |          | 2 - 60             |            | 5 - 13             |            | 2 - 10             |            | 1 - 37             | 120213      | 1 - 151            | 322550      | 1 - 144            | 510316   | 11 - 19            |
|          | 2 - 44             |          | 2 - 76             |            | 6 - 3              |            | 2 - 12             |            | 2 - 59             |             | 2 - 7              |             | 1 - 167            |          | 11 - 23            |
|          | 2 - 48             |          | 2 - 80             |            | 6 - 7              |            | 3 - 80             |            | 2 - 87             |             | 2 - 22             |             | 5 - 49C            | 518611   | 2 - 62A            |
|          | 2 - 55             |          | 2 - 88             |            | 6 - 12             |            | 3 - 104            |            | 2 - 155            |             | 2 - 32             |             | 5 - 73             | 523022   | 2 - 93             |
|          | 2 - 61             | 23105    | 2 - 96             |            | 4 - 48             |            | 3 - 138            |            | 2 - 159            |             | 2 - 71             |             | 9A - 31            | 524519   | 10 - 8             |
|          | 2 - 77             | 23141    | 2 - 100            |            | 4 - 40             |            | 9 - 26             |            | 4 - 49             | 120571      | 4 - 49             |             | 10 - 14            |          | 11 - 44            |
|          | 2 - 81             | 25627    | 2 - 132            |            | 4 - 26             |            | 9 - 65             |            | 4 - 1              | 123780      | 4 - 1              | 322551      | 3 - 30             | 526378   | 9 - 29             |
|          | 2 - 89             |          | 2 - 141            |            | 4 - 63             |            | 9 - 79             |            | 1 - 5              | 130434      | 1 - 5              |             | 3A - 2             |          | 9 - 82             |
|          | 2 - 97             |          | 2 - 146            |            | 4 - 64             | 47987      | 2 - 153            |            | 1 - 43             |             | 1 - 43             |             | 8 - 8              | 527916   | 9 - 52             |
|          | 2 - 133            |          | 2 - 156            |            | 5 - 10             |            | 5 - 57             |            | 1 - 137C           |             | 1 - 137C           |             | 9 - 28             |          | 9A - 32            |
|          | 2 - 142            |          | 2 - 160            |            | 2 - 101            | 52523      | 3 - 69             |            | 1 - 153            | 236916      | 8 - 11             | 322552      | 7 - 19             | 557669   | 1 - 72             |
|          | 2 - 147            |          | 2 - 164            |            | 1 - 73             |            | 3 - 92             |            | 1 - 187            | 242260      | 10 - 17            |             | 9 - 81             | 599557   | 2 - 66C            |
|          | 2 - 157            |          | 3 - 79             |            | 1 - 109            | 52684      | 11 - 8             |            | 1 - 207            | 251759      | 2 - 65             | 322555      | 2 - 66G            |          | 2 - 66D            |
|          | 2 - 161            |          | 3 - 103            |            | 1 - 119            | 55198      | 3 - 24             |            | 1 - 228            | 251762      | 8 - 11             | 322560      | 2 - 117            | 615354   | 11 - 46            |
|          | 2 - 165            |          | 3 - 137            |            | 1 - 194            | 55711      | 2 - 131            |            | 2 - 25             | 251970      | 3 - 133            |             | 2 - 114            | 621446   | 9 - 80             |
|          | 3 - 116C           |          | 1 - 191            |            | 1 - 235            |            | 3A - 18            |            | 2 - 34             | 253220      | 10 - 15            | 332620      | 1 - 25             | 625955   | 9 - 27             |
| 2031     | 4 - 69             | 9098     | 1 - 142            |            | 2 - 9              | 55726      | 4 - 57B            |            | 2 - 38             | 253425      | 2 - 134            |             | 1 - 148A           | 631769   | 9 - 71             |
| 2994     | 3 - 78             | 10170    | 2 - 50             |            | 2 - 84             |            | 4 - 57D            |            | 2 - 42             | 255939      | 2 - 58             |             | 1 - 149A           |          | 9A - 47            |
|          | 3 - 102            |          | 3 - 36             |            | 5 - 5              |            | 5 - 12             |            | 2 - 46             |             | 2 - 107            |             | 5 - 47             | 637733   | 1 - 18             |
| 3550     | 1 - 9              |          | 3 - 117            |            | 9 - 63             |            | 7 - 20             |            | 2 - 53             | 257187      | 3 - 72             |             | 3 - 107            |          | 11 - 42            |
|          | 1 - 22             |          | 4 - 41D            |            | 9A - 45            |            | 9 - 16             |            | 2 - 75             |             | 2 - 46             | 336628      | 4 - 19B            | 639292   | 11 - 42            |
|          | 1 - 91             |          | 5 - 17             |            | 1 - 3B             |            | 9 - 42             |            | 2 - 79             |             | 2 - 53             | 337193      | 1 - 143            | 642571   | 3 - 32             |
|          | 1 - 185C           |          | 9 - 22B            |            | 1 - 172            |            | 9A - 9             |            | 2 - 95             |             | 2 - 79             |             | 9 - 43             | 642597   | 3 - 33             |
|          | 9 - 54             |          | 9 - 32             |            | 2 - 20             |            | 9A - 19            |            | 2 - 99             |             | 2 - 95             |             | 9A - 18            | 642598   | 3 - 34             |
| 3960     | 2 - 57             |          | 9 - 57             |            | 2 - 63             | 55901      | 2 - 64             |            | 2 - 140            |             | 9A - 12            | 338238      | 3A - 7             | 676748   | 2 - 104            |
| 4564     | 2 - 127            |          | 9 - 75B            |            | 2 - 85             |            | 2 - 103            |            | 3 - 136            | 257189      | 11 - 35            | 350830      | 2 - 113            | 725506   | 12 - 15            |
| 5528     | 3 - 2              |          | 9 - 94             |            | 3 - 38             |            | 2 - 106            |            | 2 - 189            |             | 1 - 3J             |             | 2 - 114            | 736860   | 2 - 3              |
|          | 3 - 113            |          | 9A - 6             |            | 3 - 120            |            | 3 - 123            |            | 2 - 186            |             | 1 - 179            |             | 1 - 149Z           | 738826   | 3A - 16            |
|          | 4 - 21             |          | 9A - 29            |            | 4 - 24             | 55918      | 3 - 127            |            | 5 - 43             |             | 4 - 70             | 363001      | 11 - 4             | 740459   | 12 - 16            |
|          | 4 - 59             |          | 9A - 35            |            | 4 - 36             |            | 4 - 5              |            | 1 - 149F           |             | 9 - 84             |             | 11 - 13            | 740554   | 1 - 168            |
|          | 6 - 6              |          | 9A - 38            |            | 4 - 39             |            | 5 - 7              |            | 1 - 181            |             | 9A - 55            | 366291      | 4 - 7              | 749513   | 3 - 70             |
| 5644     | 1 - 158            |          | 9A - 49            |            | 4 - 52             | 56079      | 1 - 2A             |            | 12 - 1             |             | 3 - 116D           |             | 9 - 45             |          | 3 - 110            |
| 6364     | 2 - 66J            |          | 9A - 61            |            | 9 - 7              |            | 1 - 32             |            | 2 - 126            | 154214      | 5 - 44             | 367115      | 9A - 20            |          | 3 - 68             |
|          | 3 - 118            |          | 10 - 11            |            | 9 - 90             |            | 1 - 40             |            | 4 - 8K             | 156231      | 3 - 85             |             | 10 - 16            |          | 3 - 94             |
|          | 5 - 49D            | 10340    | 6 - 11             |            | 10 - 23            |            | 1 - 140A           |            | 10 - 18            | 179743      | 3 - 97             | 369207      | 2 - 180            | 753317   | 3 - 168            |
| 6935     | 1 - 10             | 11598    | 1 - 47             |            | 11 - 29            |            | 1 - 161A           |            | 9 - 35             | 179946      | 3 - 81             |             | 2 - 183            | 759024   | 3 - 129B           |
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MAINTENANCE ANALYSIS PROCEDURES (MAPs)

The Maintenance Analysis Procedures (MAPs) are a step-by-step procedure to guide you through the service call by tracing a symptom to the cause of failure. The MAPs logically approach the possible cause of machine problems and may point you to the defective component, the necessary adjustment, or the field replaceable unit (FRU).

USING THE MAPs

When using the MAPs:

- Read Carefully. The MAPs can help you find the problem only if you follow instructions and answer questions correctly.
- Follow the Sequence. Proceed step-by-step through the MAPs at all times. At times, the MAP instructions may not seem applicable to the problem. However, they can be important in determining the failure.
- Follow Instructions. Instructions should be followed in the order given. Questions are based on instructions preceding the questions. Do not change the conditions established by the instructions before answering the questions.

Throughout the MAPs, references may be made to error indicators, second-level diagrams, service aids, or other informative material.

MAP EXAMPLE:

5211 START

PAGE 1 OF 4

ENTRY POINTS

| ENTER THIS MAP |             |             |             |
|----------------|-------------|-------------|-------------|
| FROM           | ENTRY POINT | PAGE NUMBER | STEP NUMBER |
| MAP NUMBER     |             |             |             |
| 0000           | A           | 1           | 001         |

EXIT POINTS

| EXIT THIS MAP |             | TO         |             |
|---------------|-------------|------------|-------------|
| PAGE NUMBER   | STEP NUMBER | MAP NUMBER | ENTRY POINT |
| 2             | 005         | 0020       | A           |
| 2             | 007         | 0022       | A           |
| 3             | 016         | 0055       | A           |
| 3             | 015         | 0070       | A           |

This map is used to analyze the printer failure and direct you to the appropriate map.

001  
(Entry Point A)

Did the system maps direct you to the 5211 printer maps?

Y N

002  
(Entry Point B)

Record failure indicators from the system and operator detected symptoms.  
Inspect the printer for obvious causes of failure, such as a broken ribbon or print belt.  
If the cause of the failure is obvious, find the repair procedure in the Map Index 0000.  
Resolve printer power problems first.

Is a cable interlock problem or a printer power problem indicated?

Y N

4 3 2  
A B C

MAP Name and Number

MAP 0010-1

Entry and exit points — show all entry and exit points to and from this MAP.

Step Number

Instruction — establishes conditions for answering the next question.

Y = yes N = no

Off-Page Referencing — identifies the page and trace where this MAP leg continues.

C ← On-Page Referencing — indicates the trace and page where this MAP leg came from.

1 5211 START  
PAGE 2 OF 4

003  
Printer errors are indicated by a Check Light.

Question — answer either yes or no. Continue from your answer to the next question or instruction.

Is the Check Light on?

Y N

004  
Press the Stop/Reset key and then the Ready key.  
The Ready Light should come on and the print belt motor should start turning.

- Printer set-up
1. Power is on
  2. Forms are loaded
  3. Print belt is installed
  4. Throat is closed
  5. Forms thickness control is set correctly
  6. Cover closed
  7. The system must be varied OFFLINE or in a DIAGNOSTIC mode

Is the Ready Light on?

Y N

005  
Printer not ready.  
Go to MAP 0020, Entry Point A.

External Exit Point — indicates the MAP and entry point to go to.

006  
Is the print belt motor turning?

Y N

007  
Print belt motor failure.  
Go to MAP 0022, Entry Point A.

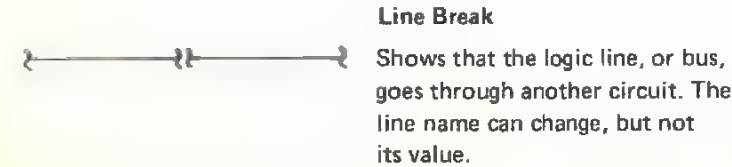
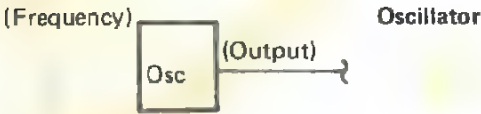
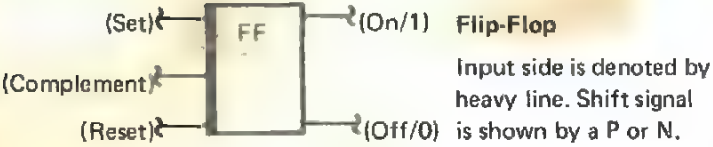
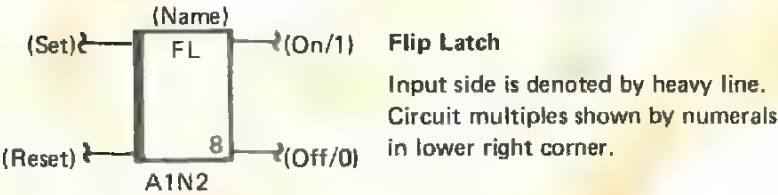
3 3  
D F

LEGEND

LOGIC SYMBOLS

Positive logic is represented in this manual, and signal levels are disregarded. The negator or inverter (N block) inverts the logic (not the level). Passive elements such as line terminators, and pulse shapers are not usually shown because they do not contribute to the logic. Wiring diagram page numbers are indicated below most logic symbols.

Data flow is normally from left to right and from top to bottom; flow that may be logically unclear is shown by arrows.



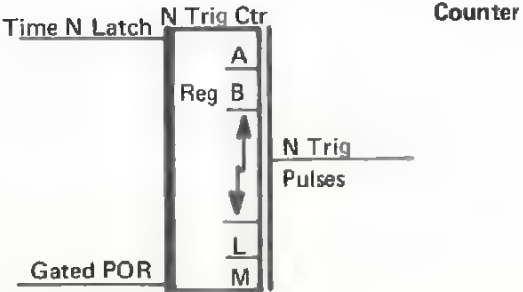
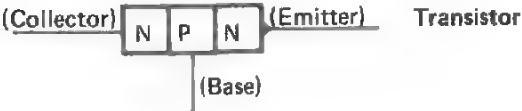
AND Block

The same basic symbol is used for other logic blocks. Each type is identified by the legend in the block, as follows:

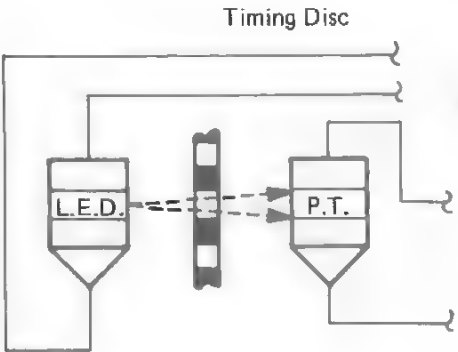
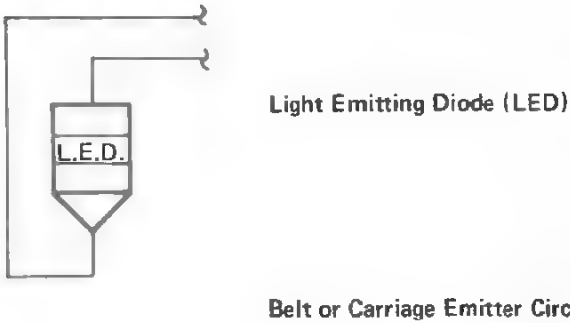
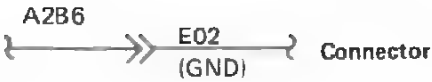
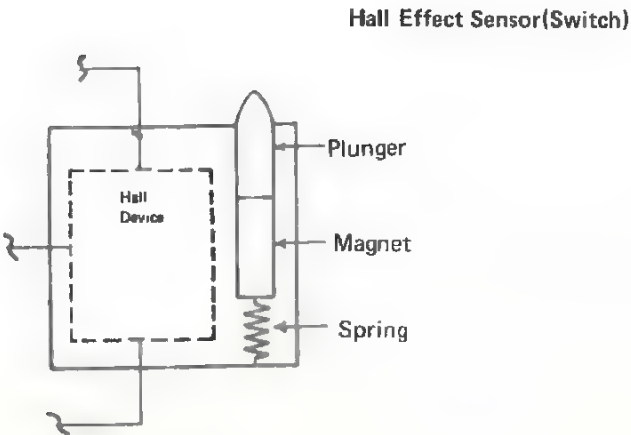
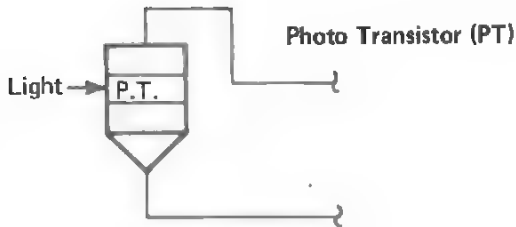
- A MD AND gate, magnet driver output
- EV even
- OD odd
- OE exclusive OR
- OR OR



**AMPLIFIER** — The amplifier (AR) provides adequate driving energy and an appropriate impedance match to other blocks. The amplifier output is active only when the input is active. An amplifier having input or output of other than standard logic signal voltage has distinctive labeling at the block.



ELECTRIC SYMBOLS





**TIMING CHARTS**

**Active State**

Numerals at the beginning and end of the bar identify the signal(s) on the same chart that activates and deactivates this line. (Not) with the number indicates that lack of the signal conditions the line.



**Line Break**

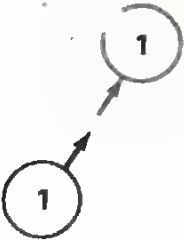
Represents an interval in time.



**KEY SYMBOLS**

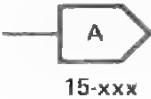
**On-Page Connector**




Indicates the connection between two parts of the same diagram. The arrow leaving the symbol points (line-of-sight) to a correspondingly numbered symbol.



**Off-Page Connector**

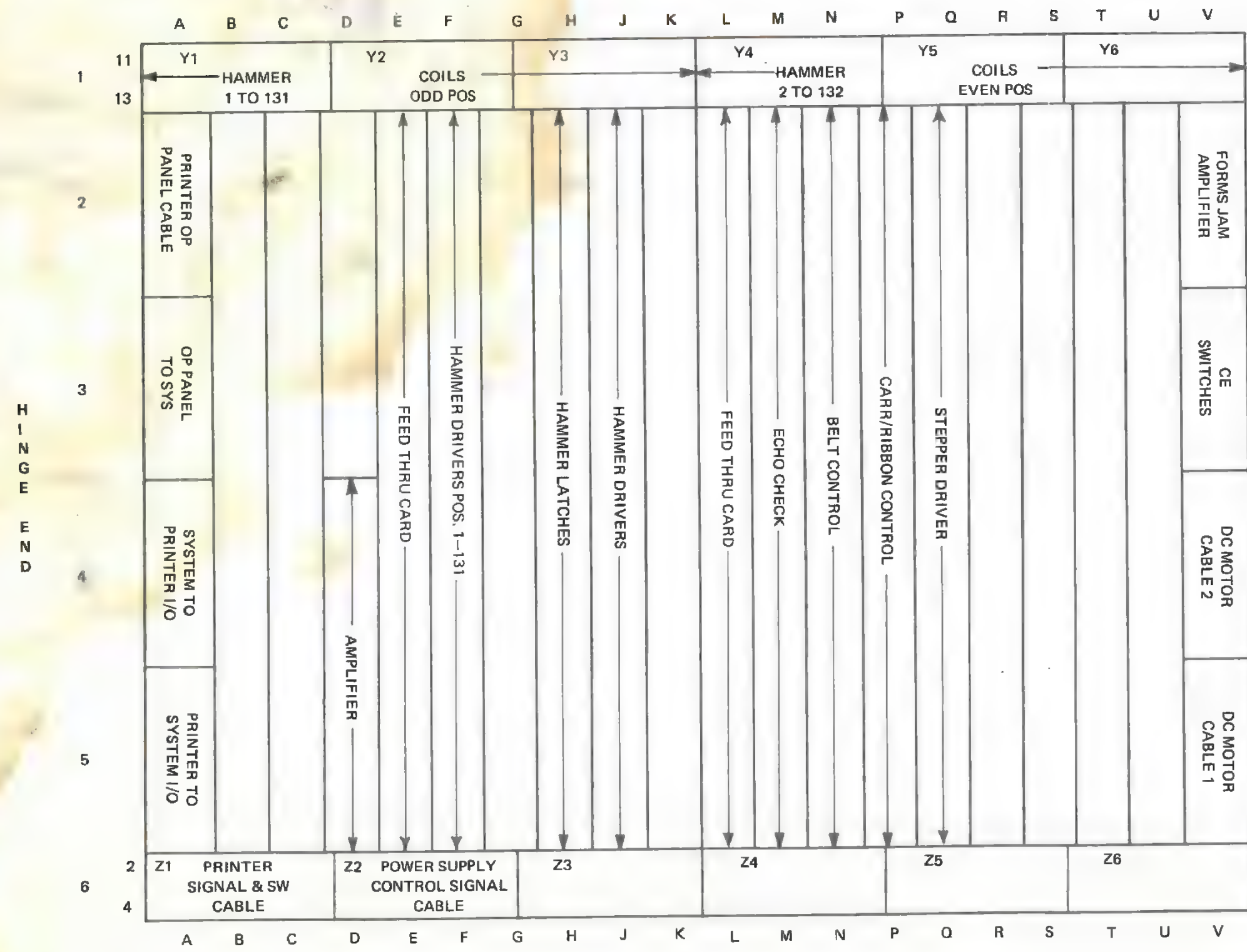
Indicates the connection between diagrams that are located on separate pages. The location of the correspondingly lettered symbol is shown adjacent.



-  Denotes a reading sequence. Corresponds with a similar key in an associated diagram.
-  Denotes a reading sequence within a diagram. Corresponds with a similar key in the associated text.
-  Denotes a nonsequential reading order. Sometimes corresponds with a similar key in an associated diagram.

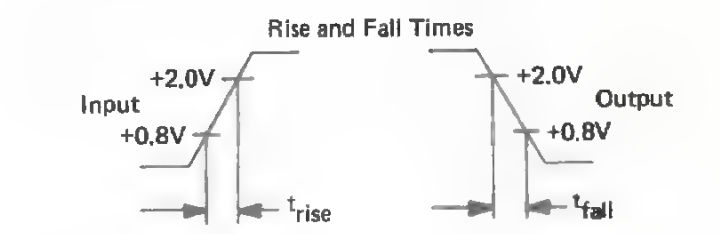
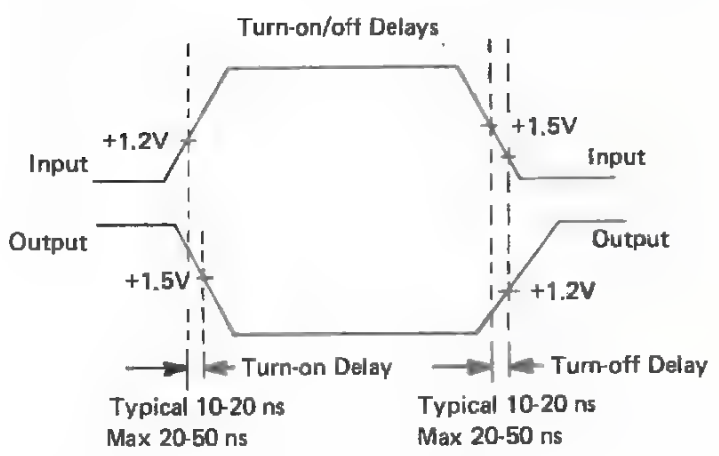
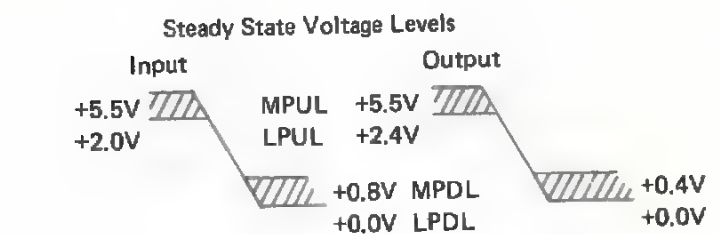
GENERAL LOGIC INFORMATION


01A-A1 BOARD LAYOUT (Example: 5211 Model 2)

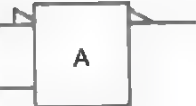


(CARD SIDE-VIEW)


VOLTAGE SWITCHING LEVELS



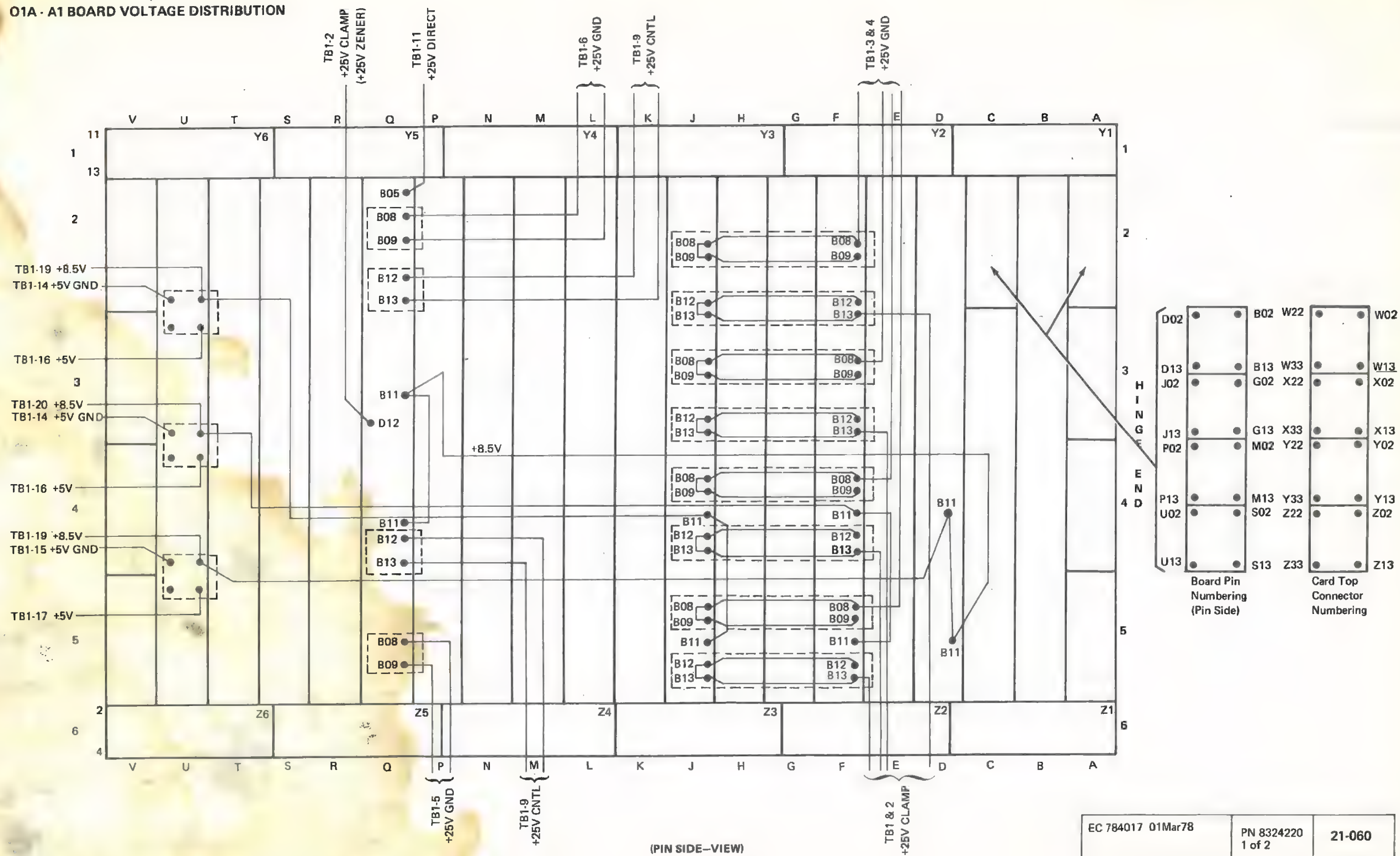
**Polarity**  
Polarity is indicated by a wedge (  ) or no wedge.

More negative voltage  More positive voltage

**Active Level**  
Active level is the line level that conforms to the edge-of-block character for that line.

This line is active when minus  This line is active when plus

### 01A - A1 BOARD VOLTAGE DISTRIBUTION





TOOLS AND TEST EQUIPMENT

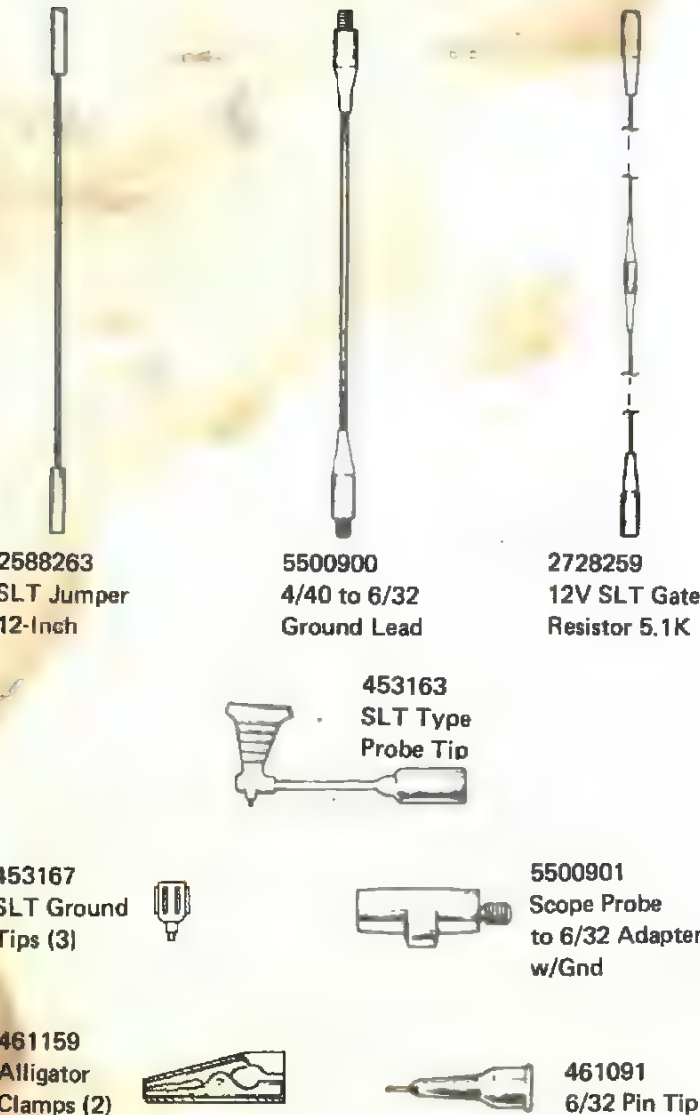
GENERAL LOGIC PROBE II (GLP)

Description

The IBM General Logic Probe II **A** is a small, rectangular, hand-held unit used by the Customer Engineer to detect logic signals for many technologies. It is designed for use on all new IBM machines that need a logic probe for maintenance. It replaces the old SLT type logic probe.

For a detailed description of the GLP Operation, specifications, and maintenance, see IBM GENERAL LOGIC PROBE II MANUAL, SY27-0127.

Accessories



Operation

**Ground Lead**  
Connect this lead to any signal ground (D08 pin) near the probe point. Do not use frame ground.

CAUTION

Improper indications result if this lead is not connected to signal ground.

Indicator Lights

UP indicates an up level (+).  
DOWN indicates a down level (-).

A pulsing line is indicated by both lights being on.

Both lights are off if the line level is from +1.0 Vdc to +2.0 Vdc for MULTI logic setting.

Safe Operating Ranges:

|          |         |        |
|----------|---------|--------|
|          | MULTI   | +60.0V |
| Logic    | MST 2/4 | +14.0V |
| Selector | MST 1   | +14.0V |

Voltages greater than the above ranges will damage the probe.

Probe UP and DOWN lights will momentarily flash on during power up if the probe is connected to its machine power source. Please ignore.

Power Leads

CAUTION

Improper connection of the power lead might cause the probe to malfunction.

Connect the black (-) power lead to M2D08 (gnd). Connect the other (+) lead to M2D03. A voltage difference of 4V to 12V is needed to power the probe, with the black lead always the most negative.

*Note:* The power leads (+) D03 and (-) D08 can be connected to any card row on the 01A1 Board, EXCEPT the A and V rows.

General Logic Probe II  
(part 453212)

Test Terminal

The line being probed is connected to this terminal. (Various probes may be attached, other than the one shown, to aid in probing.)

**Extender (part 453605).** The extender is a 24 inch (60 cm) long probe that allows the general logic probe to be used more conveniently. The extender is ordered separately from the general logic probe.

Logic Selector (TECHNOLOGY)

- 5211: MULTI  
Selects the type of logic to be probed. Circuits probed in the 5211 Printer require the MULTI setting.

LATCH Switch

- 5211: NONE  
NONE position resets the lights and prevents any latching action. This position is used for most probing in the 5211 Printer

The up position allows satching the UP light on a positive pulse. The down position allows latching the DOWN light on a negative pulse. This feature can be used to monitor for an intermittent error condition or to verify that a pulse occurred when the operator could not continuously see the probe.

GATE REF Volts Switch

- 5211: GND  
This switch affects only the gating terminals and is not required for probing the 5211 Printer.

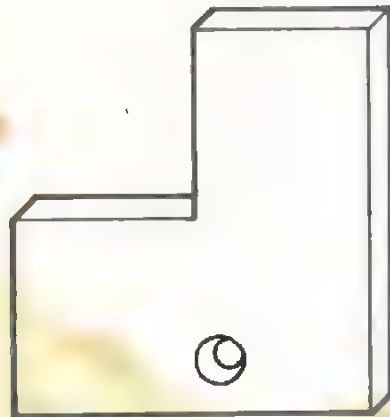
GATING Terminals

These terminals are not required for probing the 5211 Printer.

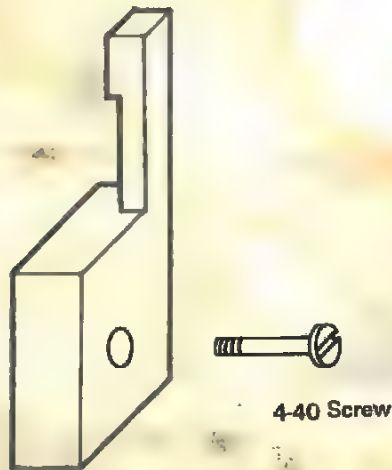
**GAUGES**

- B/M 1815365 contains the following tools:  
Platen Gap Gauge (1) Part 1814638  
Platen-to-Casting Gauge (2) Part 1815362  
4-40 Screws (2)

*Platen Gap Gauge (part 1814638)*

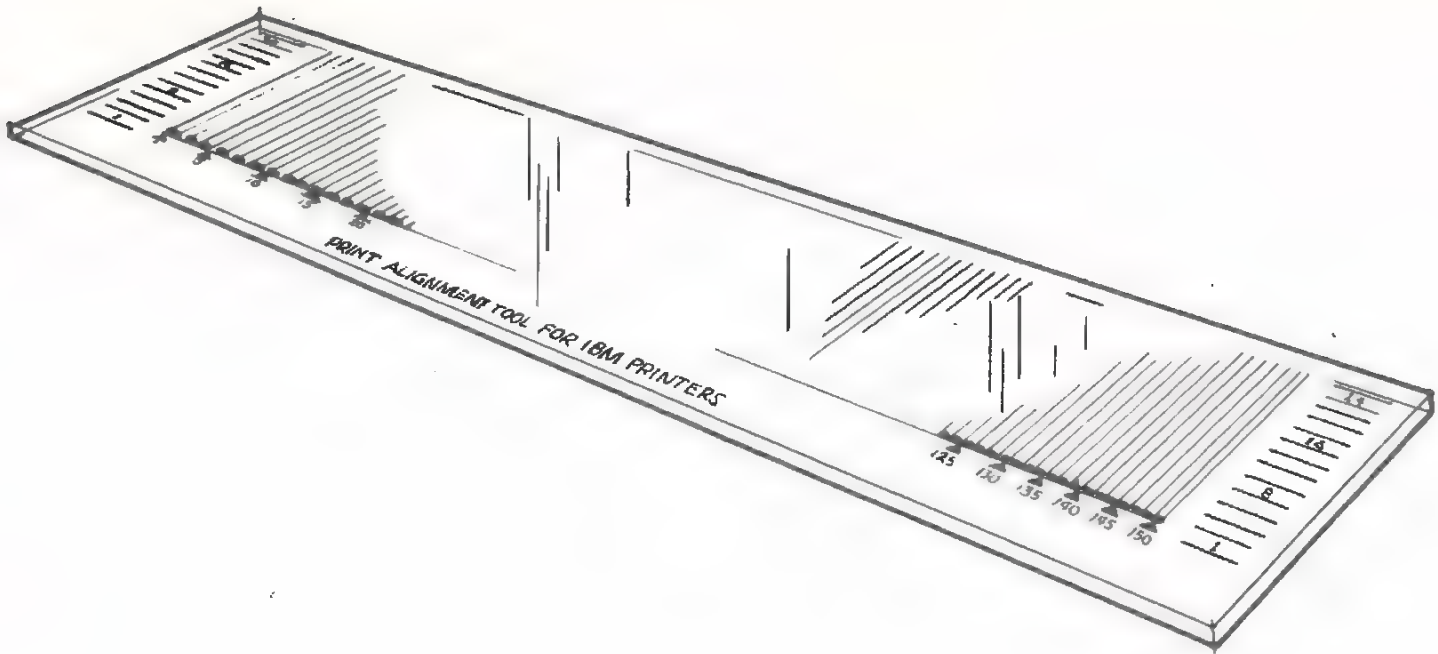


*Platen-to-Casting Gauge (part 1815362)*



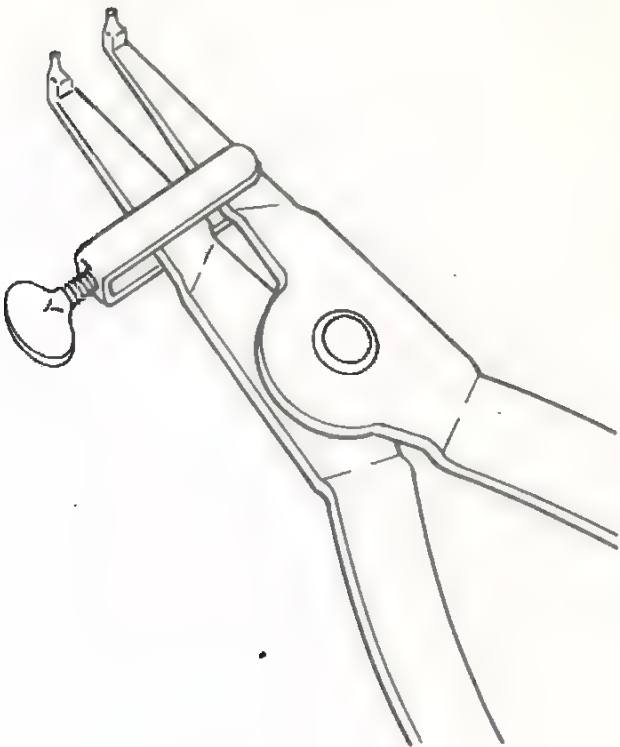
*Print Registration Gauge (part 2360173).*

*Note:* This is a Branch Office Tool and will not be found at the 5211 site.

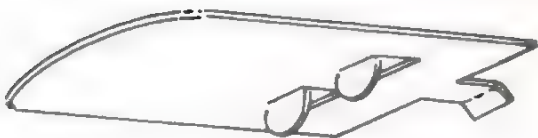


**MISCELLANEOUS**

*Snap-Ring Pliers (part 9900317)*



*Wire Removal Tool (part 453705).* This tool is used to remove wires from the printer's connector blocks.



*Bulb Extractor (part 461061)*  
For Indicator Lights on the Operator's Panel.

*Note:* These Tools and Gauges are not included in the 5211 Shipping Group. They must be ordered separately.

EC 784017 01Mar78

PN 8324221  
1 of 2

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GLOSSARY OF TERMS AND ABBREVIATIONS

A

A: Ampere, AND.  
ac: Alternating current.  
accelerate: To increase in speed. For example, the print belt motor accelerates to operating speed.  
amp: Amplifier.  
AR: Amplifier/driver.

B

BLK: Black.  
B/M: Bill of material.  
buffer: A storage device that is used to hold data for processing between the system and the printer. For example, print line buffer.  
BUTS: Belt up to speed.

C

C: Capacitor.  
carr: Carriage.  
Carriage time: The time when the carriage is moving.  
CE: Customer engineer.  
character set: One complete group of characters on the print belt.  
CK, CHK: Check.  
Closed loop: The mode of control of a stepper motor by using pulses that are generated as a result of the motor's motion (feed-back pulses). The motor is first started by an external pulse.  
cm: Centimeter.  
CNTL: Control.  
compartment: A designated space such as "stacker compartment".  
Conn: Connector.  
Ctr: Counter.

D

D: Diode.  
dc: Direct current.  
detent: A device used to position and hold one mechanical part in relation to another so that the device can be overridden by using additional force. On the 5211, an electrical detent is used to hold the carriage mechanism in place when it is not moving the forms.  
diagram: Figure.  
drag: The force put on the ribbon or forms to keep tension on them. See also ribbon drag.

E

E: Emitter.  
EC: Engineering change.  
echo: A Hammer Echo Return Signal is sent back to the System in response to each hammer-fire signal.  
EDS: Elastic-diaphragm switch.  
elastic-diaphragm switch: The switch contact is operated by a flexible key top instead of a push button. The keys used on the 5211 operator's panel are this type.  
EOF: End of forms.

F

F: Fuse.  
FCB: Forms control buffer.  
FF: Flip flop.  
Fire Tier Pulse (Fire-Time Pulse): The pulse is activated by the system to fire the group of hammer(s) that was addressed on the previous subscan. There are five separate fire-time pulses or tiers, and each tier is assigned to fire certain hammers that are aligned with characters on the belt. (1/5th of the hammers). The pulse has a variable time duration depending on the impression control single shot.  
FL: Flip latch.  
flip flop: An electronic latch having a common input that causes the status of the latch to reverse each time an input is received.  
forms chute: The forms path under the printer between the forms entry and the forms tension assembly.  
FRU: Field replaceable unit.

G

GLP: General logic probe.  
Gnd: Ground.

H

HMR: Hammer.  
Hz: Hertz.

I

IAD: Installation activity report.  
IMPSS: Impression control single shot.  
in: Inch.  
INLK: Interlock.  
IPO: Instant power off.  
IR: Incident report.  
I/O: Input/output.

K

kHz: Kilohertz.  
K: Relay or contactor.

L

LED: Light emitting diode.  
LPI: Lines per inch.  
LPUL: Least positive up-level.  
LRS: Lower ribbon shield.

M

M: Motor.  
mA: Milliampere.  
MAPs: Maintenance analysis procedures.  
max: Maximum.  
MHz: Megahertz.  
MIM: Maintenance information manual.  
min: Minimum.  
mm: Millimeter.  
monitor: To verify some specific function(s) such as the frequency of P.S.S. pulses.  
MPUL: Most positive up-level.  
ms: Millisecond.  
MST: Monolithic system technology.  
MUTS: Motor up to speed.

N

N: Negator, no, negative.  
N/O: Normally open.  
ns: Nanosecond.

O

OP: Operator.  
open loop: The mode of control of a stepper motor that uses pulses from an external source, such as an oscillator.  
option: To make available.  
OSC: Oscillator.  
oz: ounce.

P

P: Positive, plug, connector  
Paper clamp: An electromechanical device used to hold the forms firmly in position during printing.  
PED: Pedestal.  
pedestal: A circuit that provides control of a common voltage to a driver circuit such as a carriage pedestal driver.  
phototransistor(PT): An electronic device that switches voltage when light hits the light-sensing part of the device.  
pitch: The distance between hammer positions or characters on the print belt. It is expressed as a rate, such as 10 hammers per inch.  
PLB: Print line buffer.  
PM: Preventive maintenance.  
POT: Potentiometer.  
POR: Power on reset.  
POS: Position.  
Print Belt (Typebelt): The belt is a steel band that has the type characters etched near the top and timing marks near the bottom.  
Print Scan: The time for the print belt to move the physical distance between each character. A print scan has 5 subscans. scan has 5 subscans.

Print Subscan (PSS) Pulses: Two PSS pulses are generated from each timing mark on the print belt. The pulses occur in sequence (subscan 1 through subscan 5, then repeated). Five subscans make up one print scan. The pulses are used by the using system to synchronize the characters on the print belt to the correct hammer for addressing and firing. Each print subscan is assigned the certain group of hammers that are in alignment with the characters on the belt. (1/5 of the total hammers)  
Print time: The time when print scans are occurring  
PS (P/S): Power supply.  
PSS: Print subscan.  
PT: Phototransistor.

R

R: Resistor.  
Reg: Register.  
restraint: Something that limits movement.  
Ribbon drag: The force put on the ribbon by the non-driving ribbon motor to keep tension on the ribbon.

S

slew: A mode of stepper motor control. See closer oop.  
SLT: Solid logic technology.  
SS: Single shot.  
Stepper Motor: A motor that is phase-controlled by dc pulses or "steps". The motor turns when it is pulsed, and stops turning when it is not pulsed.  
sw: Switch.  
sys: System.

T

t: Time.  
TB: Terminal board/block.  
TD: Time delay.  
throat: The opening where the forms pass between the print unit casting and the hammer unit. On the 5211, when the print unit casting is closed and the print unit interlock is actuated, the signal 'throat closed' is sent to the system.  
tinsel: A cord having metal strips that is used to decrease the electrostatic charge on the forms before stacking.  
TP: Test point.  
trig: Trigger.

**U**

**UCSB:** Universal character set buffer.

**URS:** Upper ribbon shield.

**UTS:** Up to speed.

**V**

**V:** Volts, voltage.

**VOM:** Volt-ohm-meter.

**V1:** Volume 1.

**V2:** Volume 2.

**W**

**W:** Watts.

**Y**

**Y:** Yes.

**YEL:** Yellow.

$\mu$  micro  
 $\mu f$  microfarad  
 $\mu s$  microsecond

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